

CITY OF  
TAMPA, FLORIDA

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS  
PROPOSAL, BID BOND, FORM OF NOTICE OF AWARD,  
AGREEMENT, PERFORMANCE BOND AND  
SPECIFICATIONS

FOR

**Contract 20-C-00023**

# **Kid Mason Community Center Renovation**

City of Tampa  
CONTRACT ADMINISTRATION DEPARTMENT  
TAMPA MUNICIPAL OFFICE BUILDING  
306 E. JACKSON STREET - 4<sup>TH</sup> FLOOR NORTH  
TAMPA, FLORIDA 33602

JANUARY 2023

CITY OF TAMPA  
CONTRACT ADMINISTRATION DEPARTMENT  
306 E. Jackson Street 280A4N  
Tampa, FL 33602

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**BID NOTICE MEMO**

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**Electronic Bids are not allowed for these projects.**

**Physical Bids will be received no later than 1:30 p.m.** at the above address on the indicated Date(s) for the following Project(s):

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**CONTRACT NO.:** 20-C-00023; Kid Mason Community Center Renovation

**BID OPENING:** 1:30PM, Tuesday, February 14, 2023 **ESTIMATE:** \$1,500,000 **SCOPE:** Renovation of restrooms and kitchen, teaching-areas, playground and yard areas, addition of a horizontal clerestory window, removal of security bars and replacement of windows with a hurricane rated system, renovation of the porch area, replacement/upgrade of the security and video surveillance systems, update the fire/life safety system to meet current code, replacement of the existing flooring, addition of a chiller, concrete pad and all related chiller piping.

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Bids will be opened in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida 33602. The public is not allowed to attend in person.

To view the Bid Opening follow these instructions:  
To join the meeting from your computer, tablet or smartphone.

<https://global.gotomeeting.com/join/173279197>

You can also dial in using your phone. (For supported devices, tap a one-touch number below to join instantly.)  
United States: +1 (646) 749-3131 - One-touch: tel:+16467493131,,173279197#

Access Code: 173-279-197

Join from a video-conferencing room or system. Dial in or type: 67.217.95.2 or inroomlink.goto.com  
Meeting ID: 173 279 197 Or dial directly: 173279197@67.217.95.2 or 67.217.95.2##173279197

New to GoToMeeting? Get the app now and be ready when your first meeting starts:

<https://global.gotomeeting.com/install/173279197>

In accordance with the Americans with Disabilities Act ("ADA") and Section 286.26, Florida Statutes, persons with disabilities needing a reasonable accommodation to participate in this public hearing or meeting should contact the City of Tampa's ADA Coordinator at least 48 hours prior to the proceeding. The ADA Coordinator may be contacted by phone at 813-274-3964, email at TampaADA@tampagov.net, or by submitting an ADA - Accommodations Request online form available at <http://www.tampagov.net/ADARquest>.

Please note that the City of Tampa may not be able to accommodate any request received less than 48 hours before the scheduled public hearing or meeting.

Plans and Specifications and Addenda for this work may be examined at, and downloaded from, [www.demandstar.com](http://www.demandstar.com).  
Files are also available at <http://www.tampagov.net/contract-administration/programs/construction-project-bidding>.

**Email Questions to:** [contractadministration@tampagov.net](mailto:contractadministration@tampagov.net) .

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NOTICE TO BIDDERS  
CITY OF TAMPA, FLORIDA  
Contract 20-C-00023; Kid Mason Community Center Renovation

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., February 14, 2023, in the 4<sup>th</sup> Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida, there to be publicly opened and read aloud.

The proposed work is to include, but not be limited to, renovation of restrooms and kitchen, teaching-areas, playground and yard areas, addition of a horizontal clerestory window, removal of security bars and replacement of windows with a hurricane rated system, renovation of the porch area, replacement/upgrade of the security and video surveillance systems, update the fire/life safety system to meet current code, replacement of the existing flooring, addition of a chiller, concrete pad and all related chiller piping with all associated work required for a complete project in accordance with the Contract Documents.

The Instructions to Bidders, Proposal, Form of Bid Bond, Agreement, Form of Public Construction Bond, Specifications, Plans and other Contract Documents are posted at DemandStar.com. Backup files may be downloaded from <http://www.tampagov.net/contract-administration/programs/construction-project-bidding>. One set may be available for reference at the office of the Contract Administration Department, Municipal Office Building, Fourth Floor North, City Hall Plaza, Tampa, Florida 33602.

Each Proposal must be submitted on the Proposal form included in the Specifications and must be accompanied by a certified check or cashier's check on a solvent bank or trust company in compliance with Section 255.051, Florida Statutes, made payable to the City of Tampa, in an amount of not less than five per cent of the total bid, or a Bid Bond, of like amount, on the form set forth in the Contract Documents, as a guarantee that, if the Proposal is accepted, the Bidder will execute the Proposed Contract and furnish a Public Construction Bond within twenty (20) days after receipt of Notice of Award of Contract.

To be eligible to submit a proposal, a Bidder must hold the required and/or appropriate current license, certificate, or registration (e.g. DBPR license/certificate of authorization, etc.) in good standing at the time of receipt of Bids. **Per Section 489.131, Florida Statutes, Proposals submitted for the construction, improvement, remodeling, or repair of public projects must be accompanied by evidence that the Bidder holds the required and/or appropriate current certificate or registration, unless the work to be performed is exempt under Section 489.103, Florida Statutes.**

The City of Tampa reserves the right to reject any or all Bids and to waive any informalities in the Bid and/or Bid Bond. Acceptance or rejection of Proposals will be made as soon as practicable after the Proposals are received, but the City reserves the right to hold Proposals for ninety (90) days from the date of Opening.

Bid Protest Procedures: Unless subsequently indicated otherwise, in a revised posting on the Department's web page for Construction Project Bidding, the City of Tampa intends to award the referenced project to the lowest bidder listed in the tabulation posted on or about the date of Bid Opening. A bidder aggrieved by this decision may file a protest not later than 4:30 P.M., five (5) business days from the first posting thereof, pursuant to City of Tampa Code Chapter 2, Article V, Division 3, Section 2-282, Procurement Protest Procedures. Protests not conforming therewith shall not be reviewed.

Pursuant to Section 2-282, City of Tampa Code, during the solicitation period, including any protest and/or appeal, NO CONTACT with City officers or employees is permitted from any bidder or proposer, other than as specifically stated in this solicitation and as follows:  
Director of the Contract Administration Department (CAD)  
Contracts Management Supervisor, Jim Greiner  
Contract Officer, Jody Gray  
City legal department

Any Requests For Information must be submitted by email to [ContractAdministration@tampagov.net](mailto:ContractAdministration@tampagov.net)

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list." Refer to Section 287.133, Florida Statutes.

Pursuant to Section 287.087, Florida Statutes, under certain circumstances preference may be given to businesses with a drug-free workplace program that meets the requirements of said Section.

INSTRUCTIONS TO BIDDERS  
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.01 GENERAL:

The proposed work is the Kid Mason Community Center Renovation in the City of Tampa, as required for a complete project, as shown on the plans and detailed in the specifications. The work is located on land owned or controlled by the City of Tampa.

To be eligible to submit a proposal, a Bidder must hold the required and/or appropriate current license, certificate, or registration (e.g. DBPR license/certificate of authorization, etc.) in good standing at the time of receipt of Bids. **Per Section 489.131, Florida Statutes, Proposals submitted for the construction, improvement, remodeling, or repair of public projects must be accompanied by evidence that the Bidder holds the required and/or appropriate current certificate or registration, unless the work to be performed is exempt under Section 489.103, Florida Statutes.**

I-1.02 FORM PREPARATION AND PRESENTATION OF PROPOSALS: Replace the second sentence with the following: Submission of the entire specification book is not required.

I-1.03 ADDENDA – Section I-2.03 is replaced with the following: No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the City of Tampa, Contract Administration Department, 306 E. Jackson St., 4th Floor, Tampa, Florida 33602 and then emailed to [ContractAdministration@tampagov.net](mailto:ContractAdministration@tampagov.net). To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be posted on DemandStar.Com and on the Department's web page. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-1.04 INSTRUCTIONS TO BIDDERS

**SECTION 2 – GENERAL INSTRUCTIONS.** Section I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS is replaced with the following:

Proposals must be signed in ink by the Bidder with signature in full. When firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more partners. When a corporation is a bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office.

If the bidder referred to in Section I-2.07 is a corporation, it must submit; upon request, a copy of its filed Articles of Incorporation. In addition, if the bidder was incorporated in another state, it must establish that it is authorized to do business in the State of Florida. If the bidder is using a fictitious name, it must submit upon request, proof of registration of such name with the Clerk of the Circuit Court of the County where its principal place of business is. Failure to submit what is required is grounds to reject the bid of that bidder.

**SECTION 2 – GENERAL INSTRUCTIONS.** Section I-2.14 NONDISCRIMINATION IN EMPLOYMENT is changed to add the following to the end of the existing text:

The following provisions are hereby incorporated into any contract executed by or on behalf of the City. Contractor shall comply with the following Statement of Assurance: During the performance of the Contract, the Contractor assures the City, that the Contractor is in compliance with Title VII of the 1964 Civil Rights Act, as amended, the Florida Civil Rights Act of 1992, and the City of Tampa Code of Ordinances, Chapter 12, in that Firm/Contractor does not on the grounds of race, color, national origin, religion, sex, sexual orientation, gender identity or expression, age, disability, familial status, or marital status, discriminate in any form or manner against said Firm's/Contractor's employees or applicants for employment. Contractor understands and agrees that the Contract is conditioned upon the veracity of this Statement of Assurance, and that violation of this condition shall be considered a material breach of the Award/Contract. Furthermore, Contractor herein assures the City that said Contractor will comply with Title VI of the Civil Rights Act of 1964 when federal grant(s) is/are

INSTRUCTIONS TO BIDDERS  
SECTION 1 - SPECIAL INSTRUCTIONS

involved. This Statement of Assurance shall be interpreted to include Vietnam-Era Veterans and Disabled Veterans within its protective range of applicability. Firm/Contractor further acknowledges and agrees to provide the City with all information and documentation that may be requested by the City from time to time regarding the solicitation, selection, treatment and payment of subcontractors, suppliers and vendors in connection with this Award/Contract. Firm/Contractor further acknowledges that it must comply with City of Tampa Code of Ordinances, Chapter 26.5.

I-1.05 TIME FOR COMPLETION:

The work shall be arranged to be completed in accordance with a progress schedule approved by the Construction Engineer.

The time for completion of this project, referred in Article 4.01 of the Agreement, shall be 360 consecutive calendar days. The period for performance shall start from the date indicated in the Notice To Proceed.

I-1.06 LIQUIDATED DAMAGES:

The amount of liquidated damages, referred to in Article 4.06 of the Agreement, for completion of this project shall be \$500 per calendar day.

I-1.07 BASIS OF AWARD OF CONTRACT:

The basis of award referred to in Item I-2.11 of Instructions to Bidders shall be the greatest amount of work, which can be accomplished within the funds available as budgeted. The award may be made on the basis of the total bid, base bid, alternates(s) if any, unit bids if any, or any combination thereof deemed to be in the best interest of the City.

Unless all bids are rejected, the award will be made within 90 days after opening proposals.

I-1.08 GROUND BREAKING CEREMONY:

Arrangement may be made by the City in coordination with the Contractor, for construction to commence with a Ground Breaking Ceremony. Details will be discussed at the pre-construction conference.

I-1.09 INSURANCE:

The insurance required for this project shall be as indicated on the attached and incorporated Special Instructions pages beginning with page INS-1 entitled CITY OF TAMPA INSURANCE REQUIREMENTS, which among other things requires the Contractor to provide a Certificate of Insurance to the City prior to commencing work. The City may from time to time use a third-party vendor to manage its insurance certificates and related documentation which vendor may periodically initiate contact, requests for information, etc. on the City's behalf.

I-1.10 TESTING:

The Contractor shall perform all Quality Control (QC) testing to meet the FDOT requirements in the Florida Department of Transportation, JULY 2022 Standard Specifications for Road and Bridge Construction

INSTRUCTIONS TO BIDDERS  
SECTION 1 – SPECIAL INSTRUCTIONS

I-1.11 EQUAL BUSINESS OPPORTUNITY PROGRAM (EBO) REQUIREMENTS / PROJECT SUBCONTRACTING GOAL(S)

**BIDDERS MUST SUBMIT COMPLETED AND SIGNED CITY OF TAMPA FORMS MBD-10 AND MBD-20 WITH THEIR BIDS. BIDS SUBMITTED WITHOUT THESE COMPLETED FORMS (INCLUDING SIGNATURES) WILL BE DEEMED NON-RESPONSIVE. INSTRUCTIONS ON COMPLETING THE FORMS ARE INCLUDED AFTER EACH FORM IN THIS BID PACKAGE.**

**THE CHECKED BOX INDICATES SECTION THAT APPLIES TO THIS BID.**



**SUBCONTRACTING GOAL – (WMBE and SLBE)**

In accordance with the City of Tampa's EBO Program, Chapter 26.5, City of Tampa Code, the subcontracting goal(s) has/have been established for subcontracting with City-certified underutilized WMBEs (Women and Minority Business Enterprises) and/or SLBEs (Small Local Business Enterprises) on this project (hereinafter "Goal"). *The Goal is based, in part, upon the availability of City-certified firms to perform the anticipated scope of work (Bid is subject to the subcontracting project goal(s) section for which a corresponding numerical percent is indicated).* Project Industry Category: Construction

- Project Goal(s): \_\_\_\_\_% **U-WMBE (Underutilized Woman and Minority Business Enterprise) (EBO Program)**  
per MBD Form-70 the U-WMBE subcontract Classification for Construction is African American (BBE)
- \_\_\_\_\_% **SLBE (Small Local Business Enterprise) (EBO Program)** only City-certified SLBEs
- 21% **U-WMBE/SLBE Combined (EBO Program)**  
per MBD Form-70 the U-WMBE subcontract Classification for Construction is African American (BBE)  
together with City-certified SLBEs
- \_\_\_\_\_% **WMBE/SLBE ASPIRATIONAL (EBO Program)** An all-inclusive SLBE/WMBE goal; any City certified firm counts towards goal attainment.

BIDDERS MUST SOLICIT ALL COMPANIES ON THE ATTACHED AVAILABILITY CONTACT LIST at least **five (5) City business days or more prior to bid opening as a first step** to demonstrate Good Faith Efforts to achieve the Goal. Substantive documentation that demonstrates Good Faith Efforts to achieve the Goal **must be submitted with the bid**, including emails, faxes, phone calls, letters, and other communication with City-certified firms. Bidders may explore other potential opportunities for subcontracting by consulting the current directory of all certified firms posted by the City of Tampa at <https://tampa.diversitysoftware.com> as the Availability Contact List may not be inclusive of all firms that could count toward Goal attainment. However, ONLY SUBCONTRACTING with those specific WMBEs designated as "underutilized" by Classification in the appropriate industry category (and, if made applicable by being specifically included in the above Goal, SLBEs) will count toward meeting the Goal. Making Good Faith Efforts through these and other means (not pro-forma) is the responsibility of the Bidder. See the attached Good Faith Effort Compliance Plan (GFCEP) (MBD Form-50) for specific requirements.

GOOD FAITH EFFORT COMPLIANCE PLAN (GFCEP) REQUIRED (MBD FORM-50). When a Goal has been established, the Bidder **must submit** with its bid a Good Faith Effort Compliance Plan (GFCEP) using the attached MBD Form-50 together with supporting documentation as specified therein. **Submittals that do not contain MBD Form-50 when a Goal has been established will be deemed non-responsive.** Additional explanation and documentation is required whenever a City-certified subcontractor's quote is not utilized. Any additional information regarding GFCEP (post-bid) shall be only upon the City's request for clarification of information submitted with bid and not to "cure" omissions or deficiencies of the bid.

**NOTE:** When U-WMBEs are included in a Goal, only those City-certified subcontractors whose WMBE Classification is designated "underutilized" will count toward Goal attainment. Refer to **MBD Form-70** to identify underutilized WMBEs by subcontract Classification for the applicable project industry category. A prime bidder who is a City-certified WMBE and/or SLBE is not exempt from the **GFCEP MBD Form-50** requirements.



**SUBCONTRACTING GOAL – (DBE) FDOT DISADVANTAGED BUSINESS ENTERPRISE PROGRAM**

The City of Tampa is required to use the Florida Department of Transportation (FDOT) Disadvantaged Business Enterprise (DBE) program on contracts with Federal Highway Administration (FHWA) funds. Effective October 1, 2017 through to September 30, 2020, the overall FDOT DBE aspirational goal is **10.65%** and is *race neutral*, meaning that FDOT believes the aspirational DBE goal may be achieved entirely through ordinary, competitive procurement methods. Despite the absence of a contract specific DBE goal on this project, the City encourages bidders to seek out and use DBEs and other minority, small businesses. For assistance in identifying certified DBEs, FDOT offers the use of its supportive services program accessed via FDOT's Equal Opportunity Office at <http://www.fdot.gov/equalopportunity/serviceproviders.shtm>. FDOT DBE rules and regulations apply to this solicitation, including the requirement to report bidder opportunity information in the FDOT Equal Opportunity Compliance (EOC) web-based application within three (3) business days of submission of the bid for ALL subcontractors who quoted bidder for this specific project. The five (5) char/digit LAP Agreement Contract Number for this project is G \_\_\_\_\_. The web address to the EOC system is: <https://fdotwp1.dot.state.fl.us/EqualOpportunityCompliance/Account.aspx/LogIn?ReturnUrl=%2fEqualOpportunityCompliance>

**NOTE:** Regardless of FDOT DBE program applicability, for data collection purposes bidder still **must submit** City Forms MBD-10 and MBD-20 completed and signed with its bid or the bid will be deemed non-responsive.

**DIVERSITY MANAGEMENT INITIATIVE (DMI) DATA REPORTING FORMS REQUIRED FOR ALL CONTRACTS**

Bidder **must submit**, with its bid, completed and signed Forms MBD-10 and MBD-20 to be considered a responsive bid. Specifically, the 'Schedule of All Solicited Sub-(Contractors/Consultants/Suppliers) (Form MBD-10)' listing all subcontractors (including non-certified) solicited and 'Schedule of All -To Be Utilized Sub-(Contractors/Consultants/Suppliers) (Form MBD-20)' listing all subcontractors (including non-certified) to be utilized. Supplemental forms, such as 'Form MBD-40 Official Letter Of Intent' (LOI), can be submitted with the bid or once declared lowest-responsive bidder. After an award, 'DMI Sub-(Contractors/Consultants/Suppliers) Payment Form (Form MBD-30)' is to be submitted with payment requests to report payments to subcontractors and using the on-line automated MBD compliance software system available at <https://tampa.diversitysoftware.com>

**For additional information about the WMBE and SLBE programs contact the Minority and Small Business Development Office at 813-274-5522. (3-18)**

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I-1.12 BID SECURITY:

Surety companies shall have a rating of not less than B+ Class VI as evaluated in the most recently circulated Best KeyRating Guide Property/Casualty.

I-1.13 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be issued and executed by (a) surety company(ies) acceptable to the City and licensed to underwrite contracts in the State of Florida. After execution of the Agreement and before commencing work, the Contractor must provide the City a certified copy of the officially recorded Bond.

I-1.14 AGREEMENT

**SECTION 2 – POWERS OF THE CITY’S REPRESENTATIVES**, new Article 2.05:

Add the following:

Article 2.05 CITY’S TERMINATION FOR CONVENIENCE:

The City may, at any time, terminate the Contract in whole or in part for the City’s convenience and without cause. Termination by the City under this Article shall be by a notice of termination delivered to the Contractor, specify the extent of termination and the effective date.

Upon receipt of a notice of termination, the Contractor shall immediately, in accordance with instructions from the City, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

- (a) cease operations as specified in the notice;
- (b) place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- (c) terminate all subcontracts and orders to the extent they relate to the Work terminated;
- (d) proceed to complete the performance of Work not terminated; and
- (e) take actions that may be necessary, or that the City may direct, for the protection and preservation of the terminated Work.

The amount to be paid to the Contractor by the City because of the termination shall consist of:

- (a) for costs related to work performed on the terminated portion of the Work prior to the effective date including termination costs relative to subcontracts that are properly chargeable to the terminated portion of the Work;
- (b) the reasonable costs of settlement of the Work terminated, including accounting, legal, clerical and other expenses reasonable necessary for the preparation of termination settlement proposals and supporting data; additional costs of termination and settlement of subcontracts excluding amounts of such settlements; and storage, transportation, and other costs incurred which are reasonably necessary for the preservation, protection or disposition of the terminated Work; and
- (c) a fair and reasonable profit on the completed Work unless the Contractor would have sustained a loss on the entire Contract had it been completed.

Allowance shall be made for payments previously made to the Contractor for the terminated portion of the Work, and claims which the City has against the Contractor under the Contract, and for the value of materials supplies, equipment or other items that are part of the costs of the Work to be disposed of by the Contractor.

**SECTION 5 – SUBCONTRACTS AND ASSIGNMENTS**, Article 5.01, Page A-7, last paragraph:

Change “...twenty-five (25) percent...” to “...fifty-one (51) percent...”

**SECTION 8 – CONTRACTOR’S EMPLOYEES**, Article 8.03, Page A-9, delete Article 8.03 in its entirety and

Replace with the following new article:

**ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES**

The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination and must not maintain, provide or permit facilities that are segregated.

INSTRUCTIONS TO BIDDERS  
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**SECTION 10 – PAYMENTS**, Article 10.05, Page A-10, 1<sup>st</sup> Paragraph, 1<sup>st</sup> Sentence:  
Change "...fair value of the work done, and may apply for..." to "...fair value of the work done, and shall apply for..."

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.02, Page A-12, 1<sup>st</sup> Paragraph, 2<sup>nd</sup> Sentence:  
Delete the 2<sup>nd</sup> Sentence in its entirety and replace it with the following new 2<sup>nd</sup> Sentence:

Without limiting application of Article 11.07, below, whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify, defend, and hold harmless the City Indemnified Parties (as defined below) from any and all Claims (as defined below) for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.03, Page A-12:  
Delete Article 11.03 in its entirety and replace with the following new article:  
ARTICLE 11.03 INTENTIONALLY OMITTED.

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.07, Page A-12:  
Delete Article 11.07 in its entirety and replace with the following new article:

ARTICLE 11.07 INDEMNIFICATION PROVISIONS

Whenever there appears in this Agreement, or in the other Contract Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

Contractor releases and agrees to defend, indemnify and hold harmless the City, its officers, elected and appointed officials, employees, and/or agents (collectively, "City Indemnified Parties") from and against any and all losses, liabilities, damages, penalties, settlements, judgments, charges, or costs (including without limitation attorneys' fees, professional fees, or other expenses) of every kind and character arising out of any and all claims, liens, is entitled to indemnification hereunder. This obligation shall in no way be limited in any nature whatsoever by any limitation on the amount or type of Contractor's insurance coverage.

The parties agree that to the extent the written terms of this indemnification are deemed by a court of competent jurisdiction to be in conflict with any provisions of Florida law, in particular Sections 725.06 and 725.08, Florida Statutes, the written terms of this indemnification shall be deemed by any court of competent jurisdiction to be modified in such a manner as to be in fully and complete compliance with all such laws and to contain such limiting conditions or limitations of liability, or to not contain any unenforceable or prohibited term or terms, such that this indemnification shall be enforceable in accordance with and to the maximum extent permitted by Florida law.

The obligation of Contractor under this Article is absolute and unconditional; it is not conditioned in any way on any attempt by a City Indemnified Party to collect from an insurer any amount under a liability insurance policy, and is not subject to any set-off, defense, deduction, or counterclaim that the Contractor might have against the City Indemnified Party. The duty to defend hereunder is independent and separate from the duty to indemnify, and the duty to defend exists regardless of any ultimate liability of Contractor, the City, and any City Indemnified Party. The duty to defend arises immediately upon presentation of a Claim by any party and written notice of such Claim being provided to Contractor. Contractor's defense and indemnity obligations hereunder will survive the expiration or earlier termination of this Contract.

INSTRUCTIONS TO BIDDERS  
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Contractor agrees and recognizes that the City Indemnified Parties shall not be held liable or responsible for any Claims which may result from any actions or omissions of Contractor in which the City Indemnified Parties participated either through providing data or advice and/or review or concurrence of Contractor's actions. In reviewing, approving or rejecting any submissions by Contractor or other acts of Contractor, the City in no way assumes or shares any responsibility or liability of Contractor or any tier of subcontractor/subconsultant/supplier, under this Contract.

In the event the law is construed to require a specific consideration for such indemnification, the parties agree that the sum of Ten Dollars and 00/100 (\$10.00), receipt of which is hereby acknowledged, is the specific consideration for such indemnification and the providing of such indemnification is deemed to be part of the specifications with respect to the services provided by Contractor.

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.12, Page A-13:  
Change Article 11.12 to add the following new language after existing text:

The City of Tampa is a public agency subject to Chapter 119, Florida Statutes. In accordance with Florida Statutes, 119.0701, Contractor agrees to comply with Florida's Public Records Law, including the following:

1. Contractor shall keep and maintain public records required by the City to perform the services under this Agreement;
2. Upon request by the City, provide the City with copies of the requested records, having redacted records in total on in part that are exempt from disclosure by law or allow the records to be inspected or copied within a reasonable time (with provision of a copy of such records to the City) on the same terms and conditions that the City would provide the records and at a cost that does not exceed that provided in Chapter 119, Florida Statutes, or as otherwise provided by law;
3. Ensure that records, in part or in total, that are exempt or that are confidential and exempt from disclosure requirements are not disclosed except as authorized by law for the duration of the Agreement term and following completion (or earlier termination) of the Agreement if Contractor does not transfer the records to the City;
4. Upon completion (or earlier termination) of the Agreement, Contractor shall within 30 days after such event either transfer to the City, at no cost, all public records in possession of the Contractor or keep and maintain the public records in compliance with Chapter 119, Florida Statutes. If Contractor transfers all public records to the City upon completion (or earlier termination) of the Agreement, Contractor shall destroy any duplicate records that are exempt or confidential and exempt from public records disclosure requirements. If Contractor keeps and maintains public records upon completion (or earlier termination) of the Agreement, Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City in a format that is compatible with the information technology systems of the agency.

The failure of Contractor to comply with Chapter 119, Florida Statutes, and/or the provisions set forth in this Article shall be grounds for immediate unilateral termination of the Agreement by the City; the City shall also have the option to withhold compensation due Contractor until records are received as provided herein.

**IF CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS AGREEMENT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 813-274-8598, JIM.GREINER@TAMPAGOV.NET, AND CONTRACT ADMINISTRATION DEPARTMENT, TAMPA MUNICIPAL OFFICE BUILDING, 4TH FLOOR, 306 E. JACKSON ST. TAMPA, FLORIDA 33602.**



INSTRUCTIONS TO BIDDERS  
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I-1.15 Contractors must utilize the U.S. Department of Homeland Security's E-Verify Systems to verify the employment eligibility of all persons employed during the term of the Contract to perform employment duties within the State of Florida and all persons, including subcontractors, assigned by Contractor to perform work pursuant to the contract.

E-Verify. In accordance with Section 448.095, Florida Statutes, the Contractor agrees to register with and utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired during the term of the Contract for the services specified in the Contract. The Contractor must also include a requirement in subcontracts that the subcontractor must register with and utilize the E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the Contract term. If the Contractor enters into a contract with a subcontractor, the subcontractor must provide the Contractor with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. The Contractor shall maintain a copy of such affidavit for the duration of the Contract. If the City has a good faith belief that the Contractor has knowingly violated Section 448.09(1), Florida Statutes, the City shall terminate the Contract with the Contractor, and the Contractor may not be awarded a contract with the City for at least 1 year after the date on which the Contract was terminated. The Contractor is liable for any additional costs incurred by the City as a result of the termination of the Contract. If the City has a good faith belief that a subcontractor knowingly violated the law, but the Contractor has otherwise complied with the law, the City shall promptly notify the Contractor and order the Contractor to immediately terminate the contract with the subcontractor.

I-1.16 GENERAL PROVISIONS; G-2.02 Copies Furnished to Contractor: Replace the first paragraph with the following:

The Contractor shall acquire for its use copies of the plans and specifications as needed, which may be downloaded from the City's web site, at <http://www.tampagov.net/contract-administration/programs/construction-project-bidding>.

Bidder as part of the solicitation process (and as Contractor if Bidder is successful) may hold, come into possession of, and/or generate certain building plans, blueprints, schematic drawings, including draft, preliminary, and final formats, which depict the internal layout and structural elements of a building, facility, or other structure owned or operated by the City or an agency (singularly or collectively "Exempt Plans"), which pursuant to Section 119.071(3), Florida Statutes, are exempt from Section 119.07(1), Florida Statutes and Section 24(a), Art. I of the Florida State Constitution. Contractor certifies it has read and is familiar the exemptions and obligations of Section 119.071(3), Florida Statutes; further that Contractor is and shall remain in compliance with same, including without limitation maintaining the exempt status of such Exempt Plans, for so long as any Exempt Plans are held by or otherwise in its possession.

I-1.17 PAYMENT DISPUTE RESOLUTION

Any dispute pertaining to pay requests must be presented to the City pursuant to Executive Order 2003-1.

I-1.18 SCRUTINIZED COMPANIES CERTIFICATION

Section 287.135, Florida Statutes, prohibits agencies or local governmental entities from contracting for goods or services of any amount with companies that are on the Scrutinized Companies that Boycott Israel List or are engaged in a boycott of Israel, and of \$1 million or more with companies that are on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or are engaged in business operations in Cuba or Syria. Specifically, Section 287.135(2), Florida Statutes, states: "A company is ineligible to, and may not, bid on, submit a proposal for, or enter into or renew a contract with an agency or local governmental entity for goods or services of: (a) Any amount if, at the time of bidding on, submitting a proposal for, or entering into or renewing such contract, the company is on the Scrutinized

INSTRUCTIONS TO BIDDERS  
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Companies that Boycott Israel List, created pursuant to s. 215.4725, or is engaged in a boycott of Israel; or (b) One million dollars or more if, at the time of bidding on, submitting a proposal for, or entering into or renewing such contract, the company: 1. Is on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to s. 215.473; or 2. Is engaged in business operations in Cuba or Syria.”

Upon submitting its bid or proposal, a bidder/proposer: (i) certifies the company is not in violation of Section 287.135, Florida Statutes, and shall not be in violation at the time the company enters into or renews any resulting contract; and (ii) agrees any such resulting contract shall be deemed to contain a provision that allows the City, at its option, to terminate such contract for cause if the company is found to have submitted a false certification, been placed on one or any of the foregoing Lists, been engaged in a boycott of Israel, or been engaged in business operations in Cuba or Syria.

I-1.19 FLORIDA'S PUBLIC RECORDS LAW; DATA COLLECTION

Pursuant to Section 119.071(5)(a)2a, Florida Statutes, social security numbers shall only be collected from Bidders and/or Contractor by the City should such number be needed for identification, verification, and/or tax reporting purposes. To the extent Bidder and/or Contractor collects an individual's social security number in the course of acting on behalf of the City pursuant to the terms and conditions of its Proposal or, if awarded, the Agreement, Bidder and/or Contractor shall follow the requirements of Florida's Public Records Law.

I-1.20 APPRENTICESHIP REQUIREMENTS AND REPORTING FORM

Bidders shall comply with the conditions of the Apprenticeship Requirements and Reporting Form, Ordinance No. 2021-33, incorporated into the Contract and as specified therein.

I-1.21 BIDDER'S CRIMINAL HISTORY SCREENING PRACTICES

Per City of Tampa Code of Ordinances, Section 2-284, Bidder is requested to provide information as to whether Bidder has criminal history screenings similar in nature to the practices contained in Chapter 12, Article VI, City of Tampa Code of Ordinances. If the Bidder voluntarily agrees to comply with the City's criminal screening practices as provided in Chapter 12, Article IV of the City Code, the Bidder will receive a two percent (2%) discount for evaluation purposes only if Bidder submits notarized documentation with its bid, and an assurance of compliance with Section 2-284 if awarded the contract ("Ban the Box Requirements"). The City of Tampa's municipal codes are published online by the Municipal Code Corporation at the website link below.

[https://www.municode.com/library/fl/tampa/codes/code\\_of\\_ordinances](https://www.municode.com/library/fl/tampa/codes/code_of_ordinances)

# INSTRUCTIONS TO BIDDERS

## SECTION 2 GENERAL INSTRUCTIONS

### I-2.01 BIDDER'S RESPONSIBILITY

Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

Bidders must examine the Plans, Specifications, and other Contract Documents and shall exercise their own judgment as to the nature and amount of the whole of the work to be done, and for the bid prices must assume all risk of variance, by whomsoever made, in any computation or statement of amounts or quantities necessary to complete the work in strict compliance with the Contract Documents.

Elevations of the ground are shown on the Plans and are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The City may have acquired, for its own use, certain information relating to the character of materials, earth formations, probable profiles of the ground, conditions below ground, and water surfaces to be encountered at the site of the proposed work. This information, if it exists, is on file at the offices of the Department of Public Works and Bidders will be permitted to see and examine this information for whatever value they consider it worth. However, this information is not guaranteed, and Bidders should satisfy themselves by making borings or test pits, or by such other methods as they may prefer, as to the character, location, and amounts of water, peat, clay, sand, quicksand, gravel, boulders, conglomerate, rock, gas or other material to be encountered or work to be performed.

Various underground and overhead structures and utilities are shown on the plans. The location and dimensions of such structures and utilities, where given, are believed to be reasonably correct, but do not purport to be absolutely so. These structures and utilities are plotted on the Plans for the information of the Bidders, but information so given is not to be construed as a representation or assurance that such structures will be found or encountered as plotted, or that such information is complete or accurate.

### I-2.02 FORM, PREPARATION AND PRESENTATION OF PROPOSALS

Each Proposal shall be submitted upon the Proposal Form and in accordance with the instructions included herein. The Proposal Form must not be detached herefrom. All blank spaces for bid prices must be filled in, in both words and figures, with the unit or lump sum prices, or both, for which the Proposal is made. The computed total price for each unit price Contract Item shall be determined by multiplying the estimated quantity of the item, as set forth in the Proposal Form, by the corresponding unit price bid for such item. The resulting product shall be entered in the appropriate blank space under the column headed "Computed Total Price for Item". The lump sum price bid for each lump sum price Contract Item shall also be entered in the column headed "Computed Total Price for Item". If a Proposal contains any omissions, erasures, alterations, additions, or items not called for in the itemized Proposal, or contains irregularities of any kind, such may constitute sufficient cause for rejection of the Proposal. In case of any discrepancy in the unit price or amount bid for any item in the Proposal, the price as expressed in written words will govern. In no case is the Agreement Form to be filled out or signed by the Bidder.

In the case of certain jobs bid Lump Sum a "Schedule of Unit Prices" must be filled out as an attachment to the Lump Sum proposal. These prices may be used as a guide for the negotiation of change orders, at the City's option.

The proposal must be signed and certified and be presented on the prescribed form in a sealed envelope on/or before the time and at the place stated in the Notice of Bidders, endorsed with the name of the person, firm or corporation presenting it, the date of presentation, and the title of the work for which the Proposal is made.

Unless the apparent low bidder is now engaged in or has recently completed contract work for the City of Tampa, he, if requested, shall furnish to the City, after the opening of bids and prior to award, a summary statement of record of construction experience over the past three (3) years with proper supporting evidence, and, if required by the City, shall also furnish a list of equipment and other facilities pertinent to and available for the proper execution of the proposed work, and a statement of financial resources to the extent necessary to establish ability to carry on the proposed work. The City may make further investigations as considered necessary with respect to responsibility of the Bidder to whom it appears may be awarded the Contract.

If forwarded by mail, the sealed envelope containing the Proposal, endorsed as directed above, must be enclosed in another envelope addressed as specified in the Notice to Bidders and sent by registered mail.

### I-2.03 ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the Contract Administration Department, Tampa Municipal Office Building, 4th Floor North, City Hall Plaza, Tampa, Florida 33602. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be sent by certified mail, with return receipt requested, to all prospective bidders at the respective addresses furnished, for such purposes, not later than three (3) working days prior to the date fixed for the opening of the Proposals, and if requested, a copy will be delivered to the prospective bidder's representative. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

### I-2.04 BID SECURITY

Each Proposal must be accompanied by a certified or cashier's check issued by a solvent bank or trust company and payable at sight to the City of Tampa, in compliance with Section 255.051 Florida Statutes, or a Bid Bond upon the form provided herein, in an amount of not less than five percent of the sum of the computed total amount of the Bidder's Proposal as a guarantee that if the Proposal is accepted, the Bidder will execute and fill in the proposed Contract and Public Construction Bond within twenty (20) days after notice of award of the Contract. Certified checks shall have all necessary documentary revenue stamps attached if required by law. Surety on Bid Bonds shall be a duly authorized surety company authorized to do business in the State of Florida, and all such Bonds shall be issued or countersigned by a local resident producing agent, and satisfactory evidence of the authority of the person or persons executing such Bond to Execute the same shall be submitted with the Bond. Bid Bonds shall be issued by a surety company acceptable to the City.

Within ten (10) days after the opening of Proposals, the bid security of all but the three lowest Bidders will be returned. The bid security of the remaining two Bidders whose Proposals are not accepted will be

returned within ten (10) days after the execution of the Contract, or, if no such Contract has been executed, within ninety (90) days after the date of opening Proposals. The bid security of the Bidder whose Proposal is accepted will be returned only after he has duly executed the Contract and furnished the required Public Construction Bond and insurance.

Should it be necessary for the City to retain the bid security and said bid security is in the form of checks, the checks of these Bidders will be returned if replaced by Bid Bonds in an amount equal to the amount of the checks of such Bidders in such form and issued by a surety company acceptable to the City.

A Bidder may withdraw his Proposal before the time fixed for the opening of Proposals, without prejudice to himself, by communicating his purpose, in writing, to the Mayor and City Council, and when his communication is received, the Proposal will be handed to him or his authorized agent unopened. No Bidder may withdraw his Proposal within ninety (90) days after the day of opening Proposals.

The Bidder whose Proposal is accepted shall enter into a written contract, upon the Agreement form included herein, for the performance of the work and furnish the required Public Construction Bond within twenty (20) days after written notice by the City of Award of Contract has been served on such Bidder personally or after receipt of the written notice by registered mail to such Bidder at the address given in his Proposal.

If the Bidder to whom a Contract is awarded refuses or neglects to execute it or fails to furnish the required Public Construction Bond within twenty (20) days after receipt by him of the Notice of Award of Contract, the amount of his bid security shall be forfeited and shall be retained by the City as liquidated damages, and not as a penalty, it being now agreed that said sum is a fair estimate of the amount of damages that the City will sustain in case said Bidder fails to enter into a Contract and furnish the required Public Construction Bond. If a Bid Bond was furnished, the full amount of the Bond shall become due and payable as liquidated damages caused by such failure. The full amount of the bid security shall be forfeited as liquidated damages without consideration of the fact that an award may be less than the full amount of the Bidder's Proposal, excepting that the award shall be within the conditions of said Proposal relating to the basis of consideration for an award. No plea of mistake in the bid or misunderstanding of the conditions of forfeiture shall be available to the Bidder for the recovery of his deposit or as a defense to any action based upon the neglect or refusal to execute a contract.

#### I-2.05 LAWS AND REGULATIONS

The Bidder who is awarded the Contract must comply with all laws of the State of Florida, and all applicable Ordinances of the City of Tampa respecting labor and compensation and with all other statutes, ordinances, rules and regulations applicable and having the force of law.

#### I-2.06 PUBLIC CONSTRUCTION BOND

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be executed by a surety company acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. Surety companies shall have a rating of not less than: B+ Class VI as evaluated in the most recently circulated BEST'S KEY RATING GUIDE PROPERTY-LIABILITY.

#### I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS

Proposals must be signed in ink by the Bidder with signature in full. When a firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more of the partners. When a corporation is a Bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary. Anyone signing the Proposal as agent must file with it legal evidence of his authority to do so.

Bidders who are nonresident corporations shall furnish to the City a

duly certified copy of their permit to transact business in the State of Florida, signed by the Secretary of State, within ten days of the notice to do so. Such notice will be given to Bidders who are nonresident corporations, to whom it appears an award will be made, and the copy of the permit must be filed with the City before the award will be made. Failure to promptly submit this evidence of qualification to do business in the State of Florida may be basis for rejection of the Proposal.

#### I-2.08 REJECTION OF PROPOSALS

The City reserves the right to reject any Proposal if investigation of the Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligations and to complete the work contemplated therein. Any or all Proposals will be rejected if there is reason to believe that collusion exists among Bidders. Proposals will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all Proposals and to waive such technical errors as may be deemed best for the interests of the City.

#### I-2.09 QUANTITIES ESTIMATED ONLY

The estimate of quantities of the various items of work and materials, if set forth in the Proposal Form, is approximate only and is given solely to be used as a uniform basis for the comparison of Proposals.

The quantities actually required to complete the Contract work may be less or more than so estimated, and if awarded a Contract for the work specified, the Contractor agrees that he will not make any claim for damages or for loss of profits because of a difference between the quantities of the various classes of work assumed for comparison of Proposals and quantities of work actually performed. The City further reserves the right to vary the quantities in any amount.

#### I-2.10 COMPARISON OF PROPOSALS

Except jobs bid on a "One Lump Sum" basis, proposals will be compared on the basis of a total computed price arrived at by taking the sum of the estimated quantity of each item and the corresponding unit price of each item, and including any lump sum prices on individual items.

The computed total prices for individual Contract Items and the total computed price for the entire Contract, as entered by the Bidder in the Proposal Form, are for convenience only and are subject to correction in the tabulation and computation of the Proposals.

#### I-2.11 BASIS OF AWARD

The Contract will be awarded, if at all, to the lowest responsible Bidder or Bidders, as determined by the City and by the terms and conditions of the Contract Documents. Unless all bids are rejected, the award will be made within ninety (90) days after the opening of Proposals. The successful Bidder will be required to possess, or obtain, a valid City Occupational License.

#### I-2.12 INSURANCE REQUIRED

The successful Bidder and his subcontractors will be required to procure and pay for insurance covering the work in accordance with the provisions of Article 6.02 of the Agreement as indicated on special instructions pages beginning with INS-1.

#### I-2.13 NO ASSIGNMENT OF BID

No Bidder shall assign his bid or any rights thereunder.

#### I-2.14 NONDISCRIMINATION IN EMPLOYMENT

Contracts for work under this Proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must, if requested, submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order Nos. 11246 and 11375.

Bidders must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the Contract.

Successful Bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written,

signed statement from authorized agents of the labor pools with which they will or may deal for employees on the work together with supporting information to the effect that said labor pools practices and policies are in conformity with Executive Order No. 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the Contract, or a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish them prior to the award of the Contract.

#### I-2.15 LABOR STANDARDS

The Bidder's attention is directed to the Contract Provisions of the Labor Standards for federally assisted projects which may be attached to and made a part of the Agreement.

#### I-2.16 NOTICE TO LABOR UNIONS

If applicable, the successful Bidder will be required to provide Labor Unions and other organizations of workers a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers", and such form may be made a part of the Agreement.

#### I-2.17 NOTICE TO PROSPECTIVE FEDERALLY-ASSISTED CONSTRUCTION CONTRACTORS

A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted to said Secretary prior to the award of a federally-assisted construction and Contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The form of certification may be bound herein following the form of Bid Bond.

Contractors receiving federally-assisted construction Contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractor for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause:

#### NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

"A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause."

"Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide from the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause."

The United States requires a pre-award conference if a proposed construction contract exceeds one million dollars to determine if the the prospective contractor is in compliance with the Equal Employment Opportunity requirements of Executive Order 11246 of September 24, 1965. In such instances, a meeting may be scheduled at which the prospective contractor must specify what affirmative action he has taken or proposed to take to assure equal employment opportunity which must be approved by the United States before award of the contract will be authorized.

Bidders must be prepared to submit an Equal Employment Opportunity (EEO) plan at a pre-award conference. The plan must include bidding opportunities offered by the Bidder to minority subcontractors.

On October 13, 1971, President Nixon issued Executive Order 11246 emphasizing the government's commitment to the promotion of minority business enterprise. Accordingly, the United States is firmly

committed to the utilization of available resources to support this important program. U.S. agencies are most interested in realizing minority participation on the subject. Achieving equal employment opportunity compliance is required through Executive Order 11246. WE cannot emphasize too strongly that minority subcontractors be extended subcontractors bidding opportunities as but one step in your affirmative action policy.

Due to the importance of this contract, U.S. Agencies may conduct an EEO Conference prior to the award of the Contract. It is suggested that the responsive Bidder confirm the minority subcontractors he contacted for bids or quotations in his EEO plan submitted at the conference.

#### I-2.18 EEO AFFIRMATIVE ACTION REQUIREMENTS

By the submission of a Proposal, each Bidder acknowledges that he understands and will agree to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under any contract awarded pursuant to solicitation. Each Bidder agrees that if awarded a contract, he will similarly bind contractually each subcontractor. In policies, each Bidder further understands and agrees that if awarded a contract, he must engage in Affirmative Action directed to promoting and ensuring equal employment opportunity in the work force used under the contract (and he must require contractually the same effort of all subcontractors whose subcontracts exceed \$100,000). The Bidder understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the project. \*\*\*\*\* END of SECTION \*\*\*\*\*

ORDINANCE NO. 2021- 33

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**AN ORDINANCE OF THE CITY OF TAMPA, FLORIDA, AMENDING CITY OF TAMPA CODE OF ORDINANCES CHAPTER 26.5 TO ADD "ARTICLE IV. APPRENTICE REQUIREMENTS IN CITY CONSTRUCTION CONTRACTS"; SECTIONS 26.5-211 THROUGH 26.5-216; TO ESTABLISH REQUIREMENTS PERTAINING TO THE USE OF APPRENTICE LABOR IN CERTAIN CITY OF TAMPA CONSTRUCTION PROJECTS, TO INCLUDE SPECIFIC EXCEPTIONS THERETO; TO PROVIDE CONDITIONS RELATING TO DOCUMENTATION, INCENTIVE FOR COMPLIANCE, FEE FOR NONCOMPLIANCE AND OTHER REMEDIES, IMPLEMENTATION, EXPANSION OF SCOPE AND REPORTING; REPEALING ALL ORDINANCES OR PARTS OF ORDINANCES IN CONFLICT THEREWITH; PROVIDING FOR SEVERABILITY; PROVIDING AN EFFECTIVE DATE.**

WHEREAS, construction contractors in the City of Tampa have identified a shortage of skilled labor for construction projects and a need to train younger workers as the existing job force ages; and

WHEREAS, this shortage of labor could result in delays, expenses, and other challenges to the City's future construction projects; and

WHEREAS, the City of Tampa has determined that apprenticeships create opportunities for training and experience that will assist in ensuring that a trained workforce will be available for future City construction projects; and

WHEREAS, requiring the employment of apprentices on certain City of Tampa construction projects will promote business and economic development by increasing the number of skilled workers in the City; and

WHEREAS, the City of Council of the City of Tampa has determined that the creation of Chapter 26.5, Article IV, pertaining to Apprentice Requirements in City Construction Projects, is appropriate and in the interest of the public health, safety or welfare of the City of Tampa at this time; and

WHEREAS, duly noticed public hearings, as required by law, were held by the City Council of the City of Tampa at which all residents and interested persons were given an opportunity to be heard.



1 **NOW, THEREFORE,**  
2

3 **BE IT ORDAINED BY THE CITY COUNCIL**  
4 **OF THE CITY OF TAMPA, FLORIDA:**  
5

6 **Section 1.** That the recitals set forth above are hereby incorporated as if fully set  
7 forth herein.  
8

9 **Section 2.** That the City of Tampa Code, Section 26.5, is hereby amended by  
10 creating Article IV, Sections 26.5-211 through 26.5-216, to read as follows:  
11

12 **"ARTICLE IV.- APPRENTICE REQUIREMENTS IN CITY CONSTRUCTION CONTRACTS**  
13

14 **DIVISION 1. - IN GENERAL**  
15

16 **Sec 26.5-211. – Title; Applicability.**

17 This Article IV shall be known and may be cited as the "City of Tampa Apprentice  
18 Requirements in City Construction Contracts Ordinance". This Article shall apply to  
19 contracts for certain City of Tampa construction projects as specified in more detail  
20 herein.

21 **Sec. 26.5-212. Legislative Findings and Intent.**

22 (a) There is a shortage of skilled labor for construction projects and a need to train  
23 younger workers as the existing job force ages. This shortage of labor could result in  
24 delays, expenses, and other challenges to the City's future construction projects.  
25 Apprenticeships create opportunities for training and experience that will assist in  
26 ensuring that a trained workforce will be available for future City construction  
27 projects. By requiring contactors to use apprentices for City construction contracts,  
28 it is the intent of the City to increase the number of apprentices used by contractors,  
29 creating opportunities that will enable these apprentices to develop into more skilled  
30 labor that will then be available for City construction projects.

31 (b) Apprenticeship programs are recognized as an effective means of providing  
32 training and experience to individuals seeking to enter or advance in the workforce,  
33 offering an opportunity to earn wages while acquiring valuable marketable skills. The  
34 training that apprentices receive on city projects will also help them to market their  
35 skills to other contractors. In this way, apprenticeship training helps create a skilled  
36 pipeline of talent to support and sustain ongoing economic development activities in  
37 the City of Tampa.

38 **Sec.26.5-213. - Definitions.**

39 *Apprentice* means any person who is enrolled in and participating in an  
40 apprenticeship program or on-the-job training program registered with the  
41 Florida Department of Education or the United States Department of Labor, or in

1 a registered on-the-job training program, as defined in Chapter 446, Florida  
2 Statutes.

3 *Bidder* means any individual, firm, corporation, partnership, company,  
4 association, joint venture, or other entity that seeks the award of a construction  
5 contract.

6 *Contractor* means any individual, firm, corporation, partnership, company,  
7 association, joint venture, or other entity that has a construction contract with the  
8 City.

9 *Construction contract*, for purposes of this article, means a contract  
10 between the City and a contractor for a vertical construction project, as defined  
11 herein. By no later than one year after implementation of this ordinance, this  
12 definition shall be expanded to include horizontal construction projects, as also  
13 defined herein.

14 *Vertical construction project* means a project, funded by City dollars in an  
15 amount of at least one million dollars ( \$1,000,000) priced on the basis of a lump  
16 sum/fixed price amount, that involves the process of building, altering, repairing,  
17 improving, or demolishing any public structure or building, or other public  
18 improvements of any kind that are predominantly vertical (i.e., above-ground), on  
19 or to any real property owned or under the control of the City, which work is being  
20 performed under a construction contract. For purposes of this article, vertical  
21 construction also includes on-site horizontal work that is integral to or part of the  
22 vertical construction project.

23 *Horizontal construction project* means a project, funded by City dollars in  
24 an amount of at least one million dollars ( \$1,000,000) priced on the basis of a  
25 lump sum/fixed price amount, that involves construction of highways, roads,  
26 streets, bridges, utilities, water distribution or transmission pipelines, wastewater  
27 interceptors, force mains or collection systems, and stormwater conveyance  
28 facilities. For purposes of this article, horizontal construction also includes  
29 rehabilitation of water, wastewater and stormwater pipelines including, but not  
30 limited to, cured-in place, pulled-in place and pipe bursting methods.

31 *Good faith effort* means that the contractor, without an intent to defraud  
32 or seek an unfair advantage, took all necessary steps to secure and maximize,  
33 consistent with the requirements of this section, the required percentage for  
34 apprentices on a construction project, to the satisfaction of the City of Tampa.  
35 The contractor shall provide evidence of good faith efforts for consideration by  
36 the City, which evidence may include documentation of the contractor's contacts



1 with the Florida Department of Education, Division of Career and Adult  
2 Education's Apprenticeship Section; documentation of its contacts with state-  
3 approved training programs, with labor organizations, and/or with technical  
4 schools and training schools; documentation of its use of job fairs and other  
5 outreach efforts; the frequency and duration of any employment advertisements  
6 for apprentices; the extent to which the size of a contractor's workforce affects its  
7 hiring opportunities for apprentices; and any other evidence demonstrating to the  
8 satisfaction of the City that the contractor made a good faith attempt to secure  
9 apprentice labor.

10 *Subcontractor* means an entity or individual providing services to the City  
11 through a contractor for all or any portion of the construction contract.

12 *Labor hours* means the total hours worked on the site of a construction  
13 project by workers who are employed by contractors or subcontractors on the  
14 construction project, excluding hours worked by forepersons, superintendents, or  
15 owners. Notwithstanding the above, the percentage requirements of this article  
16 shall apply to the labor hours performed in a trade(s) for which registered  
17 apprenticeship programs or on-the-job training programs exist.

18 **Sec. 26.5-214. - Apprenticeship Requirements and Exceptions.**

19 (a) When responding to a City of Tampa solicitation for a vertical construction project, a  
20 bidder must certify that:

- 21 (1) The bidder or its subcontractors participate in an apprenticeship program that is  
22 registered with the Florida Department of Education or the United States  
23 Department of Labor; or
- 24 (2) The bidder commits that at the time the bidder executes a construction contract,  
25 it or its subcontractors will be participating in an apprenticeship program that is  
26 approved by the Florida Department of Education or the United States  
27 Department of Labor or an on-the-job training program; or
- 28 (3) The bidder has submitted documentation that confirms, to the satisfaction of the  
29 City of Tampa, that there are no registered apprenticeship or on-the-job training  
30 programs for any type of work to be performed on the construction project.

31 (b) Prior to the City entering a construction contract, the City must receive  
32 documentation from the bidder verifying compliance with Section 26-214(a).

33 (c) For the duration of the construction contract, as same may be extended including  
34 through the issuance of change orders, at least 12% of the labor hours performed in  
35 a trade(s) for which registered apprenticeship programs or on-the-job training  
36 programs exist, including all work performed pursuant to change orders, must be

1 performed by apprentices employed by the contractor or subcontractors, with  
2 required documentation provided to the City as set forth in Sec. 26-215 herein.

3 (d) If the contractor is unable to achieve or maintain the required percentage, the  
4 contractor must notify the City in writing and document its good faith effort, as  
5 defined herein, made to achieve or maintain the required percentage. The City will  
6 then determine whether the contractor made all required good faith effort by  
7 evaluating the contractor's submitted documentation.

8 (e) The construction contract between the City and the contractor must include a  
9 provision requiring the contractor and its subcontractors to comply with the  
10 requirements of this article.

11 (f) Exceptions.

12 (1) This article will not apply if:

13 a. It is prohibited by or in conflict with federal or state law or the terms of a  
14 federal or state grant applicable to the construction project; or

15 b. The Mayor or the Mayor's designee determines that emergency  
16 circumstances exist such that applying the article to the construction project  
17 is not in the best interest of the City.

18 (2) This article will not apply to a subcontractor that is a WMBE or SLBE if the  
19 compensation to be paid under the applicable subcontract for labor costs is less  
20 than \$1,000,000.

21 (3) The twelve percent (12%) requirement of labor hours on the construction  
22 project that must be performed by apprentices may be reduced by the Mayor or  
23 the Mayor's designee if:

24 a. The contractor has successfully demonstrated to the City, after making a  
25 good faith effort as defined herein, that the contractor has been unable to  
26 find, or there does not exist, a sufficient number or type of apprentices  
27 available to meet the required percentage; or

28 b. The Mayor or the Mayor's designee determines that there exists, for the  
29 construction project at issue, a disproportionately high ratio of material  
30 costs to labor hours, which makes infeasible the required percentage of  
31 apprentice participation.

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33 **Sec. 26.5-215. - Required Documentation, Incentive for Compliance, and**  
34 **Noncompliance Fee and Other Remedies.**

35  
36 (a) *Required documentation.* The contractor must prepare, submit, and certify, on a  
37 monthly basis for the duration of the construction contract, accurate and timely  
38 records, on a form prepared by the City, identifying the name, hourly rate, and trade  
39 classification of each apprentice, the cumulative number of hours worked on the



1 project to date by apprentices, and the labor hours of all workers used by the  
2 contractor and each subcontractor on the construction project. If a subcontractor  
3 uses apprentices that will be included to satisfy the 12% requirement set forth herein,  
4 the contractor must require that the subcontractors prepare, maintain, and certify,  
5 for submittal by the contractor to the City, accurate and timely records, on a form  
6 prepared by the City, identifying for such subcontractor, the name, hourly rate, trade  
7 classification, labor hours for apprentices used by the subcontractor on the  
8 construction project, and labor hours of all workers used by the subcontractor on the  
9 construction project.

10 (b) *Incentive for Compliance.* At the point at which a contract is 50% complete, the City  
11 will reduce 1% of the retainage, provided the City has determined that (i) the  
12 contractor is in compliance with the percentage requirements of subsection 26.5-  
13 214(c) for the work performed to date, and (ii) is otherwise performing its contract  
14 obligations to the full satisfaction of the City.

15 (c) *Fee for Partial Compliance or Noncompliance.* Contracts for all projects to which these  
16 requirements apply will provide that if a contractor fails to fully comply with the  
17 percentage requirements of subsection 26.5-214(c), and the requirement is not  
18 adjusted in writing by the Mayor or the Mayor's designee, as provided for above, the  
19 contractor will be assessed a penalty fee amount for each hour that is not achieved.

20 1. The amount per hour shall be based on the extent to which the contractor or  
21 subcontractor met the 12% labor hour requirement. The fee schedule for the  
22 amount per hour that will be assessed shall be adopted by Resolution.

23 2. The assessments imposed shall be deducted from the contractor's final pay  
24 application and shall be utilized to support construction/building trade apprentice  
25 training programs registered with the State of Florida or the United States  
26 Department of Labor and located within Hillsborough County, and/or such  
27 apprentice training programs provided by the Hillsborough County School District.

28 (d) *Noncompliance-Other Remedies.* Failure of a contractor to comply with the  
29 requirements of this article may subject the contractor to all remedies available to the  
30 City at law, including but not limited to debarment or suspension of the contractor  
31 from consideration for the award of future contracts, and termination of the  
32 construction contract.

33 **Sec. 26.5-216.- Implementation, Expansion of Scope to include Horizontal Construction,**  
34 **and Reporting.**

35 (a) *Implementation.* The Mayor or the Mayor's designee shall implement the provisions  
36 of this ordinance no later than six months from its effective date.

37 (b) *Expansion of the Scope of the Apprentice Requirements to apply to Horizontal*  
38 *Construction.* By no later than twelve months after implementation of this ordinance,  
39 this article shall be amended as necessary to expand its application to horizontal  
40 construction contracts, as defined herein.

1 (c) *Reporting.* At six month intervals during the first year after implementation of this  
2 article, and thereafter on an annual basis, the Mayor or the Mayor's designee shall  
3 prepare a report to be presented on the agenda of the City Council, that includes for  
4 each contract to which this article applies, a line item breakdown of: the name of the  
5 contractor, the name or description of the construction project, the total dollar value  
6 of the construction project, the number of apprentices hired for the construction  
7 project, the number of apprentice hours worked on the construction project, and the  
8 total labor hours expended on the construction project. Additionally, the report will  
9 identify any contracts where the 12% requirement was not met, and the reason; a  
10 report on outreach efforts made by the City Council and the City Administration, along  
11 with any other relevant details or recommendations regarding the City's  
12 apprenticeship requirements that the Mayor or the Mayor's designee wish to include.  
13

14 **Section 3.** That all ordinances or parts of ordinances in conflict herewith are repealed  
15 to the extent of any conflict with the terms of this ordinance.  
16

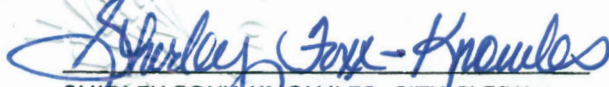
17 **Section 4.** That if any part of this Ordinance shall be declared unconstitutional or  
18 invalid by a court of competent jurisdiction, the remaining provisions shall remain in full  
19 force and effect.  
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21 **Section 5.** Except to the extent expressly addressed herein, this Ordinance shall take  
22 effect immediately upon becoming a law.  
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25 PASSED AND ORDAINED BY THE CITY COUNCIL OF THE CITY OF TAMPA,  
26 FLORIDA, ON March 18, 2021.

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CHAIRMAN/CHAIRMAN PRO-TEM,  
CITY COUNCIL

ATTEST;

  
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SHIRLEY FOXX-KNOWLES, CITY CLERK

APPROVED BY ME ON 3/22/21

  
\_\_\_\_\_  
JANE CASTOR, MAYOR





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RESOLUTION 2021 - 527

**RESOLUTION ESTABLISHING A SCHEDULE OF FEES FOR PARTIAL COMPLIANCE OR NONCOMPLIANCE WITH APPRENTICE LABOR HOUR PERCENTAGE REQUIREMENTS PURSUANT TO CHAPTER 26.5, ARTICLE IV. APPRENTICE REQUIREMENTS IN CITY CONSTRUCTION CONTRACTS, SUBSECTION 26.5-215(c)1, OF THE CITY OF TAMPA CODE; PROVIDING AN EFFECTIVE DATE.**

**WHEREAS**, on March 18, 2021, City Council adopted Ordinance No. 2021-33, which added Chapter 26.5, Article IV., Apprentice Requirements in City Construction Projects, Sections 26.5-211 through 26.5-216, to the City of Tampa Code (the "Apprentice Ordinance"); and

**WHEREAS**, Subsection 26.5-215(c) provides for the assessment of a fee for partial compliance or noncompliance with the apprentice labor hour percentage requirements of subsection 26.5-214(c), with the fee amount to be based on the extent to which the contractor or subcontractor met the apprentice labor hour requirements under the ordinance; and

**WHEREAS**, Subsection 26.5-215(c)1. provides for the adoption of a fee schedule by Resolution; and

**WHEREAS**, the fees established pursuant to this Resolution are reasonable and are consistent with the purpose, intent and express requirements of the Apprentice Ordinance.

**NOW, THEREFORE,**

**BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TAMPA, FLORIDA:**

**Section 1.** That pursuant to the authority of Section 26.5-215(c)1., the following is the schedule of fees for partial compliance or noncompliance with the apprentice labor hour requirements of subsection 26.5-214(c), City of Tampa Code:

Percent of goal met	Assessment per unmet hour
100%	\$0.00
90% to 99%	\$2.50
75% to 89%	\$5.25
50% to 74%	\$8.00
1% to 49%	\$11.25
0%	\$15.00

**Section 2.** That the proper officers of the City of Tampa are hereby authorized and directed to do all things necessary and proper in order to carry out and make effective the provisions of this resolution.







# CITY OF TAMPA INSURANCE REQUIREMENTS

Prior to commencing any work or services or taking occupancy under that certain written agreement or award (for purposes of this document, Agreement) between the City of Tampa, Florida (City) and Firm/Awardee/Contractor/Consultant/Lessee/non-City party, etc. (for purposes of this document, Firm) to which this document is attached and incorporated as an Exhibit or otherwise, and continuing during the term of said Agreement (or longer if the Agreement and/or this document so requires), Firm shall provide, pay for, and maintain insurance against claims for injuries to persons (including death) or damages to property which may arise from or in connection with the performance of the Agreement (including without limitation occupancy and/or use of certain property/premises) by Firm, its agents, representatives, employees, suppliers, subtenants, or subcontractors (which term includes sub-consultants, as applicable) of any tier subject to the terms and conditions of this document. Firm's maintenance of insurance coverage as required herein is a material element of the Agreement and the failure to maintain or renew coverage or provide evidence of same (defined to include without limitation Firm's affirmative duty to provide from time to time upon City's request certificates of insurance, complete and certified copies of Firm's insurance policies, forms, and endorsements, information on the amount of claims payments or reserves chargeable to the aggregate amount of coverage(s) whether during the term of the Agreement or after as may be requested by the City in response to an issue or potential claim arising out of or related to the Agreement to which Firm's insurance obligations hereunder may apply or possibly help mitigate) may be treated as a material breach of the Agreement. Should at any time Firm not maintain the insurance coverages required, City at its sole option (but without any obligation or waiver of its rights) may (i) terminate the Agreement or (ii) purchase such coverages as City deems necessary to protect itself (charging Firm for same) and at City's option suspending Firm's performance until such coverage is in place. If Firm does not reimburse City for such costs within 10 days after demand, in addition to any other rights, City shall also have the right to offset such costs from amounts due Firm under any agreement with the City. All provisions intended to survive or to be performed subsequent to the expiration or termination of the Agreement shall survive, including without limitation Firm's obligation to maintain or renew coverage, provide evidence of coverage and certified copies of policies, etc. upon City's request and/or in response to a potential claim, litigation, etc.

The City reserves the right from time to time to modify or waive any or all of these insurance requirements (or to reject policies) based on the specific nature of goods/services to be provided, nature of the risk, prior experience, insurer, coverage, financial condition, failure to operate legally, or other special circumstances. If Firm maintains broader coverage and/or higher limits than the minimums shown herein, the City requires and shall be entitled to such broader coverage and/or higher limits maintained by Firm. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City. No representation is made that the minimum insurance requirements are sufficient to cover Firm's interests, liabilities, or obligations. Required insurance shall not limit Firm's liability.

Firm acknowledges and agrees Firm and not the City is the party in the best position to determine applicability (e.g. "IF APPLICABLE"), confirm, and/or verify its insurance coverage. Acceptance by the City, or by any of its employees, representatives, agents, etc. of certificates or other documentation of insurance or policies pursuant to the terms of this document and the Agreement evidencing insurance coverages and limits does not constitute approval or agreement that the insurance requirements have been met or that coverages or policies are in compliance. Furthermore, receipt, acceptance, and/or approval of certificates or other documentation of insurance or policies or copies of policies by the City, or by any of its employees, representatives, agents, etc., which indicate less coverage than required does not constitute a waiver of Firm's obligation to fulfill these insurance requirements.

## MINIMUM SCOPE AND LIMIT OF INSURANCE <sup>1</sup>

A. Commercial General Liability (CGL) Insurance on the most current Insurance Services Office (ISO) Form CG 00 01 or its equivalent on an "occurrence" basis (Modified Occurrence or Claims Made forms are not acceptable without prior written consent of the City). Coverage must be provided to cover liability contemplated by the Agreement including without limitation premises and operations, independent contractors, contractual liability, products and completed operations, property damage, bodily, personal and advertising injury, contractual liability, explosion, collapse, underground coverages, personal injury liability, death, employees-as-insureds. Products and completed operations liability coverage maintained for at least 3 years after completion of work. Limits shall not be less than \$1M per occurrence and \$2M general aggregate for Agreements valued at \$2M or less; if valued over \$2M, a general aggregate limit that equals or exceeds the Agreement's value. If a general aggregate limit applies; it shall apply separately to the project/location (ISO CG 2S 03 or 2S 04 or equivalent). **(ALWAYS APPLICABLE)**

B. Automobile Liability (AL) Insurance in accordance with Florida law, as to the ownership, maintenance, and use of all owned, non-owned, leased, or hired vehicles. AL insurance shall not be less than: (a) \$500,000 combined single limit each occurrence bodily injury and property damage for Agreements valued at \$100,000 or less or (b) \$1M combined single limit each occurrence bodily injury and property damage for Agreements valued over \$100,000. If transportation of hazardous material involved, the MCS-90 endorsement (or equivalent). **(ALWAYS APPLICABLE)**

C. Worker's Compensation (WC) & Employer's Liability Insurance for all employees engaged under the Agreement, Worker's Compensation as required by Florida law. Employer's Liability with minimum limits of (a) \$500,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each employee for Agreements valued at \$100,000 and under or (b) \$1M bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each for all other Agreements. **(ALWAYS APPLICABLE)**

D. Excess (Umbrella) Liability Insurance for Agreements valued at \$2M or more, at least \$4M per occurrence in excess of underlying limits and no more restrictive than underlying coverage for all work performed by Firm. May also compensate for a deficiency in CGL, AL, or WC. **(ALWAYS APPLICABLE)**

E. Builder's Risk Insurance for property loss exposure associated with construction/renovation/additions to buildings or structures, including materials or fixtures to be incorporated. Must be "All Risk" form with limits of no less than the project's completed value, have no coinsurance penalties, eliminate the "occupancy clause", cover Firm (together with its contractors, subcontractors of every tier, and suppliers), and name City as a Loss Payee. **(IF APPLICABLE)**

F. Installation Floater coverage for property (usually highly valued equipment or materials such as compressors, generators, etc.) during its installation. Coverage must be "All Risk" including installation and transit for no less than 100% of the installed replacement cost value. **(IF APPLICABLE)**

G. Architects & Engineers Liability/ Professional Liability (E&O)/ Contractors Professional Liability (CPL)/ Medical Malpractice Insurance where Agreement involves Florida-regulated professional services (e.g. architect, engineer, design-builder, CM, accountant, appraiser, investment banker medical professional) at any tier, whether employed or independent, vicarious design liability exposure (e.g. construction means & methods, design supervision), value engineering, constructability assessments/reviews, BIM process, and/or performance specifications. Limits of at least \$1M per occurrence and \$2M aggregate; deletion of design/ build liability exclusions, as applicable, and maintained for at least 3 years after completion of work/services and City's acceptance of same. **(IF APPLICABLE)**

H. Railroad Protective Liability CRPL Insurance for construction within 50ft of operated railroad track(s) or where affects any railroad bridge, trestle, tunnel, track(s) roadbed, or over/under pass. Subject to involved rail road's approval prior to commencement of work. **(IF APPLICABLE)**.

I. Pollution and/or Asbestos Legal Liability Insurance where Agreement involves asbestos and/or environmental hazards/contamination risks (defined broadly, e.g. lead, mold, bacteria, fuel storage, underground work, cleanup (owned or non-owned sites), pollutant generation/transportation, marine/natural resource damage, contamination claim, restitution, business interruption, mold, fungus, lead-based paint, 3rd party claims/removal, etc.), with limits of at least \$1M per occurrence and \$2M aggregate, maintained for at least 3 years after Agreement completion. **(IF APPLICABLE)**

J. Cyber Liability Insurance where Agreement involves portals allowing access to obtain, use, or store data; managed dedicated servers; cloud hosting services; software/hardware; programming; and/or other IT services

<sup>1</sup> "M" indicates million(s), for example \$1M is \$1,000,000

and products are involved. Limits of not less than \$2M per occurrence and \$2M aggregate. Coverage sufficiently broad to respond to duties and obligations undertaken by Firm, and shall include, but not be limited to, claims involving infringement of intellectual property/copyright, trademark, trade dress, invasion of privacy violations, damage to or destruction of electronic information, information theft, release of confidential and/or private information, alteration of electronic information, extortion, virus transmission, and network security. Coverage, as applicable and with sufficient limits to respond, for breach response costs, regulatory fines and penalties, credit monitoring expenses. **(IF APPLICABLE)**

K. Drone/UAV Liability Insurance where Agreements involves unmanned aerial vehicles/drones. Coverage to include products and completed operations, property damage, bodily injury with limits no less than \$1M per occurrence, and \$2M aggregate; may be provided by CGL endorsement subject to City's prior written approval. **(IF APPLICABLE)**

L. Longshore & Harbor Workers' Compensation Act/Jones Act for work being conducted near, above, or on "navigable waters" for not less than the above Employer's Liability Insurance limit. **(IF APPLICABLE)**

M. Garagekeeper/Hangerkeeper/Marina Operator Legal Liability Insurance and/or Hull/P&I Insurance where parking lot, valet, dealership, garage services, towing, etc. and/or operation of a hangar, marina, or air

plane/ship repairer, providing safe berth, air/watercraft storage/docking (on land/ in water), fueling, tours, charters, ferries, dredges, tugs, mooring, towing, boat/aircraft equipment/repair/alteration/maintenance, etc.; cover- age against liability for damage to vehicles air/watercraft, their machinery in Firm's care, custody, or control both private & commercial. Limits at least equal to greater of \$1M, value of max number of vehicles that may be in Firm's custody, or of most costly object in Firm's custody. **(IF APPLICABLE)**

N. Property Insurance and Interruption of Business CIOB) Insurance where premises, building, structure, or improved real property is leased, licensed, or otherwise occupied by Firm. Property Insurance against all risks of loss to any occupant/tenant improvements at full replacement cost with no coinsurance penalty, including fire, water, leak damage, and flood, as applicable, vandalism and malicious mischief endorsements. IOB by which minimum monthly rent will be paid to City for up to 1 year if premises are destroyed, rendered inaccessible or untenable, including disruption of utilities, water, or telecommunications. **(IF APPLICABLE)**

O. Liquor Liability/Host Liquor Liability where Firm directly or indirectly provides alcoholic beverages, limits of at least \$1M per occurrence and \$1M aggregate. **(IF APPLICABLE)**

P. Educators Legal Liability Insurance where day care, after school program, recreational activities, etc. limits per G above. **(IF APPLICABLE)**

### ADDITIONAL REQUIREMENTS

ACCEPTABILITY OF INSURERS- Insurance is to be placed with insurers admitted in the State of Florida and who have a current A.M. Best rating of no less than **A-:VII** or, if not rated by A.M. Best, as otherwise approved by the City in advance and in writing.

ADDITIONAL INSURED - **City, its elected officials, departments, officers, officials, employees, and volunteers together with, as applicable, any associated lender of the City shall be covered as additional insureds on all liability coverage** (e.g. CGL, AL, and Excess (Umbrella) Liability) as to liability arising out of work or operations performed by or on behalf of Firm including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of Firm. Coverage can be provided in the form of an endorsement to Firm's insurance (at least as broad as ISO Form CG 20 10 11 85 or **both** CG 10 20, CG 20 26, CG 20 33, or CG 20 38 **and** CG 20 37 if later revisions used).

CANCELLATION/NON-RENEWAL – Each insurance policy shall provide that at least 30 days written notice must be given to City of any cancellation, intent to non-renew, or material reduction in coverage (except aggregate liability limits) and at least 10 days' notice for non-payment of premium. Firm shall also have an independent duty to notify City in like manner, within 5 business days of Firm's receipt from its insurer of any notices of same. If any policy's aggregate limit is reduced, Firm shall directly take steps to have it reinstated. Notice and proof of renewal/continued coverage/certifications, etc. shall be sent to the City's notice (or Award contact) address as stated in the Agreement with a copy to the following:

- Contract Administration Department, 306 E Jackson St, Tampa, FL 33602     Purchasing Department, 306 E Jackson Street, Tampa, FL 33602  
 Other: \_\_\_\_\_

CERTIFICATE OF INSURANCE (COI) – to be provided to City by insurance carrier prior to Firm beginning any work/services or taking occupancy and, if the insurance expires prior to completion of the work or services or Agreement term (as may be extended), a renewal COI at least 30 days before expiration to the above address(es). COIs shall specifically identify the Agreement and its subject (project, lease, etc.), shall be sufficiently comprehensive to insure City (named as additional insured) and Firm and to certify that coverage extends to subcontractors' acts or omissions, and as to permit the City to determine the required coverages are in place without the responsibility of examining individual policies. **Certificate Holder must be The City of Tampa, Florida.**

CLAIMS MADE – If any liability insurance is issued on a claims made form, Firm agrees to maintain such coverage uninterrupted for at least 3 years following completion and acceptance of the work either through purchase of an extended reporting provision or purchase of successive renewals. The Retroactive Date must be shown and be a date not later than the earlier of the Agreement date or the date performance/occupancy began thereunder.

DEDUCTIBLES/ SELF-INSURED RETENTIONS (SIR) – must be disclosed to City and, if over \$500,000, approved by the City in advance and in writing, including at City's option being guaranteed, reduced, or eliminated (additionally if a SIR provides a financial guarantee guaranteeing payment of losses and related investigations, claim administration, and defense expenses). Firm shall be fully responsible for any deductible or SIR (without limiting the foregoing a policy with a SIR shall provide or be endorsed to provide that the SIR may be satisfied by either the City or named insured). In the event of loss which would have been covered but for a deductible or SIR, City may withhold from any payment due Firm, under any agreement with the City, an amount equal to same to cover such loss should full recovery not be obtained under the policy.

PERFORMANCE- All insurance policies shall be fully performable in Hillsborough County, Florida (the County), and construed in accordance with Florida law. Further, all insurance policies must expressly state that the insurance company will accept service of process in the County and that the exclusive venue for any action concerning any matter under those policies shall be in the appropriate state court of the County.

PRIMARY POLICIES - Firm's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as to the City, its elected officials, departments, officers, employees, and volunteers. Any insurance or self-insurance maintained by the City, its elected officials, departments, officers, employees, and volunteers shall be excess of the Firm's insurance and shall not contribute with it.

SUBCONTRACTORS/INDEPENDENT ASSOCIATES/CONSULTANTS/SUBTENANTS/SUBLICENSEE - **Firm shall require and verify that all such entities maintain insurance meeting all requirements stated herein with the City as an additional insured** by endorsement (ISO FORM CG 20 38, or broader) or otherwise include such entities within Firm's insurance policies. Upon City's request, Firm shall furnish complete and certified copies of copies of such entities' insurance policies, forms, and endorsements.

SUBCONTRACTOR DEFAULT INSURANCE CONTROLLED INSURANCE PROGRAM, WRAP-UP. Use requires express prior written consent of City Risk Manager.

UNAVAILABILITY- To the fullest extent permitted by law, if Firm is out of business or otherwise unavailable at the time a claim is presented to City, Firm hereby assigns to the City all of its right, title and interest (but not any liabilities or obligations) under any applicable policies of insurance.

WAIVER OF SUBROGATION – With regard to any policy of insurance that would pay third party losses, Firm hereby grants City a waiver of any right to subrogation which any insurer of Firm may acquire against the City by virtue of the payment of any loss under such insurance. Firm agrees to obtain any endorsement that may be necessary to affect such waiver, but this provision shall apply to such policies regardless.

WAIVER/RELEASE AGREEMENT – Where Firm has a defined group of persons who might be exposed to harm (e.g. participants in an athletic event/program, volunteers) any waiver or release agreement used by Firm whereby such persons (and their parent/guardian as applicable) discharge Firm from claims and liabilities, shall include the City, its elected officials, departments, officers, officials, employees, and volunteers to the same extent as Firm.

## Procurement Guidelines To Implement Minority & Small Business Participation

### Underutilized WMBE Primes by Industry Category

<b>FORMAL PROCUREMENT</b>	Construction	Construction-Related	Professional	Non-Professional	Goods
	Black	Asian	Black	Black	Black
	Hispanic	Native Am.	Hispanic	Asian	Hispanic
	Native Am.	Woman	Asian	Native Am.	Asian
	Woman		Native Am.		Native Am.
			Woman		Woman

### Underutilized WMBE Sub-Contractors / Sub-Consultants

<b>SUB WORK</b>	Construction	Construction-Related	Professional	Non-Professional	Goods
	Black	Black	Black	Black	Black
		Asian	Hispanic	Asian	Asian
		Native Am.	Asian	Native Am.	Native Am.
		Woman	Native Am.		Woman
			Woman		

#### Policy

The Guidelines apply to formal procurements and solicitations. WMBE participation will be narrowly-tailored.

#### Index

- Black = Black/African-American Business Enterprise
- Hispanic = Hispanic Business Enterprise
- Asian = Asian Business Enterprise
- Native Am. = Native American Business Enterprise
- Woman = Woman Business Enterprise (Caucasian)

#### Industry Categories

**Construction** is defined as: new construction, renovation, restoration, maintenance of public improvements and underground utilities.

**Construction-Related Services** are defined as: architecture, professional engineering, landscape architecture, design build, construction management services, or registered surveying and mapping.

**Professional Services** are defined as: attorney, accountant, medical doctor, veterinarian, miscellaneous consultant, etc.

**Non-Professional Services** are defined as: lawn maintenance, painting, janitorial, printing, hauling, security guard, etc.

**Goods** are defined as: all supplies, materials, pipes, equipment, machinery, appliances, and other commodities.

#### MBD Form-70

**FY21 - Kid Mason Recreation Center Renovations  
FY 21 Project 20-C-00023  
U-WMBE Availability Contact List**

**(The Underutilized WMBE Industry Category for Construction Subcontracts is BBE )**

**This Certified Contact List is the minimum contacts available and may require further searches for certified firms to meet Good Faith Efforts.**

#/s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Cert. Type	Ethnicity
1	DAWUD TRASH REMOVAL SERVICES	813-394-3316	813-512-7619	dallen_99@hotmail.com	3006 E 38th Ave	Tampa	FL	33610	Site Work	844175100	BBE	African American
1	ECO 2000 INC	352-793-5060	352-793-9074	WATERWORKS@ECO2000INC.COM	1611 W C-48	BUSHNELL	FL	33513	Site Work	993648996	BBE	African American
1	Global Construction and Home Repair, LLC	813-239-4231	813-684-3074	globalchrepair@gmail.com	522 S Saint Cloud Avenue	Valrico	FL	33594	Site Work	473004378	BBE	African American
1	McKenzie Contracting LLC	813-454-4429	813-454-4429	valarie@mckenziecontractingllc.com	7712 W Broadway Ave	Tampa	FL	33619	Site Work	463561860	BBE	African American
2	Global Construction and Home Repair, LLC	813-239-4231	813-684-3074	globalchrepair@gmail.com	522 S Saint Cloud Avenue	Valrico	FL	33594	Concrete	473004378	BBE	African American
3	A Purpose Construction LLC	727-417-4106		andrew@apurposeconst.com	6001 Leeland St S	St. Petersburg	FL	33715	Masonry	822640354	BBE	African American
3	Allen Masonry & General Contractor, Inc.	813-924-3337	813-982-0894	donna@allenmasonrygc.com	Thonotosassa FL	Thonotosassa	FL	33592	Masonry	993752366	BBE	African American
3	E/S Concrete Service, Inc.	727-560-0957	727-821-5029	enorissys@yahoo.com	726 E. Harbor Drive	St. Petersburg	FL	33705	Masonry	993119582	BBE	African American
3	LMCC Specialty Contractors	407-298-6936	407-290-1217	lynn@mimsconstruction.com	119 S. Pine hills Rd.	Orlando	FL	32811	Masonry	993442318	BBE	African American
3	Paragon Building Contractors, Inc.	813-373-3154	813-932-1108	jeriel.davis@gmail.com	1201 W WATERS AVENUE	TAMPA	FL	33604	Masonry	992464751	BBE	African American
3	Provisions Construction & Development, Inc.	407-985-2442	407-985-2440	marrington@provisionscdi.com	3401 Lake Breeze Drive Bldg 601	Orlando	FL	32808	Masonry	462802435	BBE	African American
5	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaarestorationandbuilders.com	3922 N Central Ave	Tampa	FL	33603	Wood Framing	824814598	BBE	African American
6	R L Building Contractors Inc	813-516-6489	813-200-8105	rbuildingcontractors@yahoo.com	4701 East Hanna Avenue	Tampa	FL	33610	Roofing	762703712	BBE	African American
7	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaarestorationandbuilders.com	3922 N Central Ave	Tampa	FL	33603	Doors & Windows	824814598	BBE	African American
8	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaarestorationandbuilders.com	3922 N Central Ave	Tampa	FL	33603	Roofing	762703712	BBE	African American
9	Amer Plus Janitorial Maintenance	305-725-2385		scetoute@amerplusjmi.com	1265 NE 203rd street	Miami	FL	33179	Flooring	421583060	BBE	African American
9	Envision-CS, Inc	813-997-0330	813-464-7677	info@envision-cs.com	5000 Acline Drive East	Tampa	FL	33619	Flooring	764124511	BBE	African American
9	Versa-Tile & Marble, Inc.	850-259-4667		shaun.womack@versatilemi.com	1620 Sand Hollow Lane	Valrico	FL	33594	Flooring	841634057	BBE	African American
10	Versa-Tile & Marble, Inc.	850-259-4667		shaun.womack@versatilemi.com	1620 Sand Hollow Lane	Valrico	FL	33594	Tile	841634057	BBE	African American
11	Abacron LLC	813-539-8087		abacronllc@gmail.com	7113 Whittier st	Tampa	FL	33617	Painting	834687515	BBE	African American
11	Obi Global, LLC	813-400-8562		obigloballlc@gmail.com	P O Box 234	Mango	FL	33550	Painting	471881723	BBE	African American
12	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaarestorationandbuilders.com	3922 N Central Ave	Tampa	FL	33603	Carpentry	824814598	BBE	African American
15	Gilliam Construction LLC	941-723-1000	941-723-1001	ggilliamconstruction@yahoo.com	2315 17th St E	Palmetto	FL	34221	Plumbing	464098717	BBE	African American
15	Reeves Building and Plumbing Contractor, Inc.	813-238-6197	813-238-6197	ReevesBuilding@verizon.net	P O BOX 11724	TAMPA	FL	33680	Plumbing	993011515	BBE	African American
16	5ASinc,LLC	973-393-3677		asincllc@gmail.com	2319 Amesbury Cir	Wellington	FL	33414	Electrical	834698305	BBE	African American
16	All-In-One Electric, Inc.	813-849-6331	813-514-0473	ereed@atolelectric.com	1201 W WATERS AVENUE	TAMPA	FL	33604	Electrical	043689273	BBE	African American
16	Brown & Brown Electric, Inc.	954-938-8986	954-938-9272	hermine.brown@brownandbrownelectric.com	1150 SW 30th Avenue	Pompano Beach	FL	33069	Electrical	992283954	BBE	African American
16	MDH Enterprises, Inc.	386-789-2672	866-681-5026	matize@my-es.com	281 East C Street	Orange City	FL	32763	Electrical	950849332	BBE	African American
16	VoltAir Constructors, LLC	813-867-4899	813-867-4566	kwilliams@voltairinc.com	6005 Benjamin Rd	Tampa	FL	33634	Electrical	472756788	BBE	African American

African American/Black Business Enterprises (BBE) shall count toward the subcontract goal. Refer to MBD Form 70 - Procurement Guidelines.

**FY21 - Kid Mason Recreation Center Renovations  
 FY 21 Project 20-C-00023  
 SLBE Availability Contact List**

**This Certified Contact List is the minimum contacts available and may require further searches for certified firms to meet Good Faith Efforts.**

#/s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Ethnicity
1	Asphalt Millings, Inc.	352-799-5828	813-996-0390	admin@amirecycling.com	17710 U.S. 41	Spring Hill	FL	34610	Site Work	252727536	Caucasian
1	Global Construction and Home Repair LLC	813-239-4231	813-684-3074	globalchrepair@gmail.com	522 S Saint Cloud Avenue	Valrico	FL	33594	Site Work	73004378	African American
1	McKenzie Contracting LLC	813-454-4429	813-454-4429	valarie@mckenziecontractingllc.com	7712 W Broadway Ave	Tampa	FL	33619	Site Work	63561860	African American
1	Ortzak Construction Group, LLC	813-961-6023	813-961-6023	dcastrortzak.com	13014 N Dale Mabry Hwy, Ste 623	Tampa	FL	33618	Site Work	54837502	Hispanic American
1	Paynes Environmental Services, LLC	813-677-6822	866-467-9029	paynestrees@cs.com	5617 Causeway Blvd	Tampa	FL	33619	Site Work	71037046	Hispanic American
1	Velocity Construction, Inc.	813-624-2117	800-807-0314	bill@velocityconstruction.net	1320 E. 137th Ave	Tampa	FL	33613	Site Work	743082984	Caucasian
2	Meyer Corp.	813-210-4864	813-645-5634	Renatonj@aol.com	6308 Lake Sunrise Dr.	Apollo Beach	FL	33572	Concrete	62384669	Caucasian
2	CARIA CONSTRUCTION, INC	813-304-7158		Carly@puleosconcrete.com	2010 Chickwood ct.	tampa	FL	33618	Concrete	63665283	Caucasian
2	Global Construction and Home Repair LLC	813-239-4231	813-684-3074	globalchrepair@gmail.com	522 S Saint Cloud Avenue	Valrico	FL	33594	Concrete	73004378	African American
2	H.B. Underground Inc	813-455-5815		hugo726b@gmail.com	11500 N Dale Mabry Hwy	Tampa	FL	33618	Concrete	822208449	Hispanic American
3	A Purpose Construction LLC	727-417-4106		andrew@apurposeconst.com	6001 Leeland St S	St. Petersburg	FL	33715	Masonry	822640354	African American
3	Allen Masonry & General Contractor, Inc.	813-924-3337	813-982-0894	donna@allenmasonrygc.com	9822 Davis Family Pl	Thonotosassa	FL	33592	Masonry	993752366	African American
3	CARIA CONSTRUCTION, INC	813-304-7158		Carly@puleosconcrete.com	2010 Chickwood ct.	tampa	FL	33618	Masonry	63665283	Caucasian
3	E/S Concrete Service, Inc.	727-560-0957	727-821-5029	enorisslrs@yahoo.com	726 E. Harbor Drive	St. Petersburg	FL	33705	Masonry	993119582	African American
3	P&H STUCCO & CONSTRUCTION INC	727-934-9049	727-934-9049	olgaangel7@msn.com	1705 Sunset Drive	TARPON SPRING	FL	34689	Masonry	993220391	Caucasian
3	Paragon Building Contractors, Inc.	813-373-3154	813-932-1108	Jeriel.davis@gmail.com	1201 W WATERS AVENUE	TAMPA	FL	33604	Masonry	992464751	African American
3	Tampa Bay Construction & Engineering, Inc.	813-984-9898		tampabayconstructioninc@gmail.com	10503 Palm Cove Ave	Tampa	FL	33647	Masonry	993713572	Caucasian
5	paramount trim	813-393-6492	813-476-6366	darrick@aaarestationandbuilders.com	3922 N Central Ave	Tampa	FL	33603	Wood Framing	824814598	African American
6	Integrity Pressure Cleaning, Inc.	813-495-4991	727-489-1841	ciudamarinvestments@gmail.com	5314 56th Commerce Park Blvd	Tampa	FL	33610	Wood Framing	200264390	Caucasian
6	AAA Restoration & Builders, LLC	813-293-4077		michah@integritypressurecleaning.com	3513 W Price Ave	Tampa	FL	33611	Roofing	823670441	Hispanic American
6	R L Building Contractors Inc	813-516-6489	813-200-8105	rflbuildingcontractors@yahoo.com	11717 US 92	Seffner	FL	33584	Roofing	743144700	Hispanic American
7	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaarestationandbuilders.com	4701 East Hanna Avenue	Tampa	FL	33603	Roofing	8262703712	African American
7	Advanced Door Services, Inc.	813-759-4300		lspradling@advanceddoorservices.com	3922 N Central Ave	Tampa	FL	33603	Doors & Windows	824814598	African American
8	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaarestationandbuilders.com	1602 E Alsbrook Street	Plant City	FL	33563	Doors & Windows	811515179	Caucasian
8	Ciudamar Investments, LLC	813-495-4991	727-489-1841	ciudamarinvestments@gmail.com	3922 N Central Ave	Tampa	FL	33603	Drywall	824814598	African American
9	Mom & Daughter's Team LLC	727-657-5576		momanddaughter@yahoo.com	3513 W Price Ave	Tampa	FL	33611	Drywall	823670441	Hispanic American
					4706 30th Ave N	St. Petersburg	FL	33713	Flooring	814091364	Hispanic American

**FY21 - Kid Mason Recreation Center Renovations  
FY 21 Project 20-C-00023  
SLBE Availability Contact List**

#'s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Type	Ethnicity
10	Ciudamar Investments, LLC	813-495-4991	727-489-1841	ciudamarinvestments@gmail.com	3513 W Price Ave	Tampa	FL	33611	Tile	823670441	SLBE	Hispanic American
11	Abacron LLC	813-539-8087		abacronllc@gmail.com	7113 Whittier st	Tampa	FL	33617	Painting	834687515	SLBE	African American
11	Federico's Painting Corp	813-908-1404	813-908-1404	adelapav50@hotmail.com	6615 Winding Oak Dr.	Tampa	FL	33625	Painting	203279278	SLBE	Hispanic American
11	JCPAINTING&RENOVATIONS INC	813-732-8322		sandrafrauco72@msn.com	5608 Pinnacle Heights Circle	Tampa	FL	33624	Painting	453966370	SLBE	Hispanic American
11	Obi Global, LLC	813-400-8562		objgloballc@gmail.com	P.O.Box 234	Mango	FL	33550	Painting	71881723	SLBE	African American
11	P&H STUCCO & CONSTRUCTION INC	727-934-9049	727-934-9049	olgaangel7@msn.com	1705 Sunset Drive	TARPON SPRING	FL	34689	Painting	993220391	SLBE	Caucasian
11	Sunstate Coatings, Inc.	813-598-0802	813-672-6172	sunstatecoatings@msn.com	11501 Mellowood Drive	Riverview	FL	33569	Painting	202618835	SLBE	Caucasian
12	AAA Restoration & Builders, LLC	813-515-5288		darrick@aaa restorationandbuilders.com	3922 N Central Ave	Tampa	FL	33603	Carpentry	824814598	SLBE	African American
12	paramount trim	813-393-6492	813-476-6366	sasha@paramounttb.com	5314 56th Commerce Park Blvd	Tampa	FL	33610	Carpentry	200264390	SLBE	Caucasian
14	3H Contracting, Inc.	813-979-4208	813-902-2088	3HAC@3hcontracting.com	930 East 124th Avenue	Tampa	FL	33612	HVAC	010740360	SLBE	Caucasian
14	DJ'S Commercial Air	813-451-2272	813-948-1224	jdcd1001@hotmail.com	16557 Hanna Rd	Lutz	FL	33549	HVAC	113810019	SLBE	Caucasian
15	Advanced Systems Engineering, Inc.	727-540-9396	727-540-9376	david@ase2000.com	13555 Automobile Blvd., Suite 330	Clearwater	FL	33762	Plumbing	993617586	SLBE	Caucasian
15	BUSTO PLUMBING SERVICES, INC.	813-251-1061	813-253-3938	jason@bustoplumbing.com	1702 WEST SAINT LOUIS ST	TAMPA	FL	33607	Plumbing	993224808	SLBE	Hispanic American
15	Ciccarello & Son, Inc.	813-933-5512	813-933-5225	jjccarello@ciccarelloandson.com	7121 N. Armenia Ave.	Tampa	FL	33604	Plumbing	993492581	SLBE	Caucasian
15	First Plumbing & Air Conditioning of FL, Inc.	813-770-0361		firstplumbing@msn.com	13932 Methodist Church Rd.	Dover	FL	33527	Plumbing	993389067	SLBE	Hispanic American
15	Gilliam Construction LLC	941-723-1000	941-723-1001	ggilliamconstruction@yahoo.com	2315 17th St E	Palmetto	FL	34221	Plumbing	464098717	SLBE	African American
15	JVA Plumbing, Inc.	813-841-5874	813-254-0256	Jannet.varon@jvaconstruction.com	2138 W Grace Street	Tampa	FL	33607	Plumbing	273906735	SLBE	Hispanic American
15	Larson Plumbing, Inc.	813-242-0911	813-242-0048	chris@larsonplumbing.net	3205 E. 8th Ave.	Tampa	FL	33605	Plumbing	993254656	SLBE	Caucasian
15	Uona Plumbing, Inc.	813-477-1870	813-262-8599	silvia@lloaplumbing.com	1523 W. Grace Street	Tampa	FL	33607	Plumbing	962444131	SLBE	Hispanic American
15	Reeves Building and Plumbing Contractor, Inc.	813-238-6197	813-238-6197	ReevesBuilding@verizon.net	P O BOX 11724	TAMPA	FL	33680	Plumbing	993011515	SLBE	African American
16	All-in-One Electric, Inc.	813-849-6331	813-514-0473	ereed@aoelectric.com	1201 W WATERS AVENUE	TAMPA	FL	33604	Electrical	043689273	SLBE	African American
16	Brite Ideas Electric, LLC	813-498-2339	813-498-2724	plyush@briteideaselectric.com	15432 N Nebraska Ave	Tampa	FL	33549	Electrical	825090837	SLBE	Asian American
16	Electric World Corp	813-785-5265	866-593-5921	Electricworldcorp@gmail.com	5708 N 56th St	tampa	FL	33610	Electrical	831112415	SLBE	Hispanic American
16	Infinity Industrial Controls Inc	727-216-6416		Finance@iicontrols.com	1057 CEPHAS RD	CLEARWATER	FL	33765	Electrical	273205660	SLBE	Caucasian
16	Manatee Electric, Inc.	813-645-7000	813-653-1920	john@reliableelectricusa.com	845 Thompson Rd.	Lithia	FL	33547	Electrical	993454485	SLBE	Caucasian
16	Reliability Consulting Services, Inc.	813-298-2617	813-645-2272	bwoolbright@reliabilityconsulting.net	748 Kingston Ct.	Apollo Beach	FL	33572	Electrical	201126584	SLBE	Caucasian
16	ROB MICHAEL INC	813-323-0304	813-968-1036	R/MICHAEL74@AOL.COM	16204 SAGEBRUSH RD	TAMPA	FL	33618	Electrical	064389755	SLBE	Caucasian
16	TAMCO Electric, Inc.	813-918-8489	813-986-5979	atrjhill@tampabay.rr.com	4022 W South Avenue	Tampa	FL	33614	Electrical	991396630	SLBE	Hispanic American



**FY21 - Kid Mason Recreation Center Renovations  
FY 21 Project 20-C-00023  
Non-UWMBE/SLBE Availability Contact List**

This Certified Contact List is the minimum contacts available and may require further searches for certified firms to meet Good Faith Efforts.

#'s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Cert. Type	Ethnicity
1	Ortzak Construction Group, LLC	813-961-6023	813-961-6023	dcastro@ortzak.com	13014 N Dale Mabry Hwy, Suite 623	Tampa	FL	33618	Site Work	454837506	MBE	Hispanic American
1	Paynes Environmental Services, LLC	813-677-6822	866-467-9029	paynestrees@cs.com	5617 Causeway Blvd	Tampa	FL	33619	Site Work	271037042	MBE	Hispanic American
2	4M Market Solutions, LLC	813-924-1057		justin@4mtrb.com	402 havenwood way	Vairico	FL	33594	Concrete	273334414	MBE	Native American
2	CARIA CONSTRUCTION, INC	813-304-7158		Carly@puleosconcrete.com	2010 Chickwood ct.	tampa	FL	33618	Concrete	463665283	MBE	Caucasian
2	CMS Crawford Maintenance Services LLC.	727-216-6469	727-216-6524	marina@crawfordmain.com	14028 Palm Way	Laigo	FL	33771	Concrete	262249991	MBE	Hispanic American
2	Diamant Development LLC	352-551-3194		diamantdevelopmentllc@gmail.com	905 Spring Valley Rd	Altamonte Sprir	FL	32714	Concrete	813746486	WBE	Caucasian
2	H.B. Underground Inc	813-455-5815		hugot26b@gmail.com	11500 N Dale Mabry Hwy	Tampa	FL	33618	Concrete	842208449	WBE	Hispanic American
3	CARIA CONSTRUCTION, INC	813-304-7158		Carly@puleosconcrete.com	2010 Chickwood ct.	tampa	FL	33618	Masonry	663665283	WBE	Caucasian
3	P&H STUCCO & CONSTRUCTION INC	727-934-9049	727-934-9049	olgaangel7@msn.com	1705 Sunset Drive	TARPON SPRING	FL	34689	Masonry	993220391	WBE	Caucasian
5	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	Janice@gunthers.com	1420 Park Commerce Court	St. Cloud	FL	34769	Wood Framing	21615800	WBE	Caucasian
6	Ciudamar Investments, LLC	813-495-4991	727-489-1841	ciudamarinvestments@gmail.com	3513 W Price Ave	Tampa	FL	33611	Roofing	232670441	MBE	Hispanic American
6	Cladding Systems, Inc.	813-250-0786	813-250-1286	lisagalexander@cladsys.com	3218 E 4th Ave	Tampa	FL	33605	Roofing	593676052	WBE	Caucasian
6	Integrity Pressure Cleaning, Inc.	813-293-4077		mich@integritypressurecleaning.com	11717 US 92	Seffner	FL	33584	Roofing	743144700	MBE	Hispanic American
6	Keys All Area Roofing, Inc.	813-372-0111	813-372-0112	service@allarroofing.com	1820 N. 57th Street	Tampa	FL	33619	Roofing	593434736	WBE	Caucasian
7	Advanced Door Services, Inc.	813-759-4300		ispradling@advanceddoorservices.com	1602 E Alsobrook Street	Plant City	FL	33563	Doors & Windows	811515179	WBE	Caucasian
8	Ciudamar Investments, LLC	813-495-4991	727-489-1841	ciudamarinvestments@gmail.com	3513 W Price Ave	Tampa	FL	33611	Drywall	232670441	MBE	Hispanic American
8	CORE USA CONSTRUCTION INC	954-774-0015	407-957-9929	management@coreusaconstruction.com	6827 SEA CORAL DR APT 428	ORLANDO	FL	32821	Drywall	851025626	MBE	Hispanic American
8	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	Janice@gunthers.com	1420 Park Commerce Court	St. Cloud	FL	34769	Drywall	21615800	WBE	Caucasian
9	Mom & Daughter's Team LLC	727-657-5576		momanddaughter@yahoo.com	4706 30th Ave N	St. Petersburg	FL	33713	Flooring	814091364	MBE	Hispanic American
10	Architectural Tile & Marble, LLC	813-839-2100		graham@archtile.com	5303 S MacDill Av	Tampa	FL	33611	Tile	593113936	MBE	Hispanic American
10	Ciudamar Investments, LLC	813-495-4991	727-489-1841	ciudamarinvestments@gmail.com	3513 W Price Ave	Tampa	FL	33611	Tile	823670441	MBE	Hispanic American
11	C&C Painting Contractors Inc.	813-886-7100	813-886-7102	carlos@ccpainting.com	8372 Standish Bend Dr.	Tampa	FL	33615	Painting	593617521	MBE	Hispanic American
11	Federico's Painting Corp	813-908-1404	813-908-1404	adelapav50@hotmail.com	6615 Winding Oak Dr.	Tampa	FL	33625	Painting	203279278	MBE	Hispanic American
11	J. MORI PAINTING, INC.	305-825-7144	305-825-7145	jmori@jmoripainting.com	2561 West 80th Street	Hialeah	FL	33016	Painting	650167126	MBE	Hispanic American
11	JCPAINTING&RENOVATIONS INC	813-732-8322		sandrafranco72@msn.com	5608 Pinnacle Heights Circle	Tampa	FL	33624	Painting	453966370	MBE	Hispanic American
11	P&H STUCCO & CONSTRUCTION INC	727-934-9049	727-934-9049	olgaangel7@msn.com	1705 Sunset Drive	TARPO SPRING	FL	34689	Painting	993220391	WBE	Caucasian
12	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	Janice@gunthers.com	1420 Park Commerce Court	St. Cloud	FL	34769	Carpentry	21615800	WBE	Caucasian
14	Air Efficiency Corp	305-903-2541		airefficiencyinc@gmail.com	462 W 84 ST	Hialeah	FL	33014	HVAC	477242469	WBE	Hispanic American
15	Alvarez Plumbing Company, Inc.	813-655-7520	813-247-3994	lcraddock@alvarezplumbing.com	1623 S. 51st Street	Tampa	FL	33619	Plumbing	593553075	MBE	Hispanic American
15	BUSTO PLUMBING SERVICES, INC.	813-251-1061	813-253-3938	jason@bustoplumbing.com	1702 WEST SAINT LOUIS ST	TAMPA	FL	33607	Plumbing	593224808	MBE	Hispanic American
15	Ciccarello & Son, Inc.	813-933-5512	813-933-5225	jjcicarello@ciccarelloandson.com	7121 N. Armenia Ave.	Tampa	FL	33604	Plumbing	593492581	WBE	Caucasian
15	First Plumbing & Air Conditioning of FL, Inc.	813-770-0361		firstplumbing@msn.com	13992 Methodist Church Rd.	Dover	FL	33527	Plumbing	593389067	MBE	Hispanic American
15	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	Janice@gunthers.com	1420 Park Commerce Court	St. Cloud	FL	34769	Plumbing	21615800	WBE	Caucasian
15	JVA Plumbing, Inc.	813-841-5874	813-254-0256	Jannet.varon@jvaconstruction.com	2138 W Grace Street	Tampa	FL	33607	Plumbing	273906735	WBE	Hispanic American
15	Llona Plumbing, Inc.	813-477-1870	813-262-8599	silvia@llonaplumbing.com	1523 W. Grace Street	Tampa	FL	33607	Plumbing	662444131	MBE	Hispanic American
15	McLain & McLain Enterprises	813-876-9046		krista@mcclainplumbingtampa.com	2403 East 4th Avenue	Tampa	FL	33605	Plumbing	593261752	WBE	Caucasian
15	Total Building Solutions, Inc.	813-661-8818	813-661-8897	mreeves@tbs.net	3107 Queen Palm Drive	Tampa	FL	33619	Plumbing	593630540	MBE	Hispanic American
16	Berno Enterprises, Inc	813-628-5584	813-749-9470	rocha@rochacontrols.com	5025 W. Rio Vista Ave	Tampa	FL	33634	Electrical	993425954	MBE	Hispanic American
16	Brite Ideas Electric, LLC	813-498-2339	813-498-2724	plyush@briteideaselectric.com	15432 N Nebraska Ave	Tampa	FL	33549	Electrical	825090837	MBE	Asian American
16	Electric World Corp	813-785-5265	866-593-5921	Electricworldcorp@gmail.com	5708 N 56th St	tampa	FL	33610	Electrical	931112415	MBE	Hispanic American
16	Energy Services and Products Corp	813-931-8853	813-931-8853	padilla.melissa@gmail.com	3817 W. Humphrey St. #203	Tampa	FL	33614	Electrical	593241383	MBE	Hispanic American
16	Erwin Electric, Inc	813-855-0048	813-855-5404	robin@erwinelectric.com	13817 MONROE BUSINESS PARK	TAMPA	FL	33635	Electrical	593490070	WBE	Caucasian
16	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	Janice@gunthers.com	1420 Park Commerce Court	St. Cloud	FL	34769	Electrical	21615800	WBE	Caucasian
16	Infinity Industrial Controls Inc	727-216-6416		Finance@iicontrols.com	1057 CEPHAS RD	CLEARWATER	FL	33765	Electrical	273205660	WBE	Caucasian
16	MCS of Tampa, Inc.	813-872-0217	813-876-6317	twitmore@mcs oftampa.com	8510 Sunstate Street	Tampa	FL	33634	Electrical	593059024	MBE	Hispanic American
16	TAMCO Electric, Inc.	813-918-8489	813-986-5979	atrullj@tampabay.rr.com	4022 W South Avenue	Tampa	FL	33614	Electrical	591396630	MBE	Hispanic American

Instructions Regarding Use of the WMBE/SLBE Availability Contact List

**Bidders must solicit a subcontracting bid from ALL of the firms listed on the WMBE/SLBEs list provided within the Specifications,** and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step in demonstrating Good-Faith Efforts to achieve the goal set for WMBE/SLBE participation on this contract.

The list is formatted to facilitate e-mailing of a solicitation to the listed firms by copying and pasting the email addresses.

The WMBE/SLBE participation Goal is based upon the availability of the certified firms indicated on the contact list. The Goal and Requirements of the City's Equal Business Opportunity Program are stated in the Bid/Contract Document, Specifications.



PROPOSAL

To the Mayor and City Council of the City of Tampa, Florida:

Legal Name of Bidder: \_\_\_\_\_

Bidder's Fictitious Name, if applicable: \_\_\_\_\_

Bidder is a/an:  Individual  Partnership\*  Joint Venture\*  LLC  Corp.  Other:

Bidder is organized under the laws of:  State of Florida  Other:

Bidder Mailing Address: \_\_\_\_\_

Bidder's Federal Employee Identification No. (FEI/EIN): \_\_\_\_\_

Bidder's License No.: \_\_\_\_\_ Bidder's FDOS (SUNBIZ) Doc. No.: \_\_\_\_\_

*(See Ch. 489. FS; use entity's, individual's only if applicable)*

Bidder Contact Name\*\*: \_\_\_\_\_ Email: \_\_\_\_\_ Phone: (\_\_\_\_) \_\_\_\_\_

Bidder's own initial application for employment has criminal history screening practices similar in nature to the practices contained in Chapter 12, Article VI, City of Tampa Code (*Responses, whether "Yes" or "No", are for informational purposes only and will not be used as a basis of award or denial, nor as a basis for any protest*):  Yes  No

The below named person, appearing before the undersigned authority and after being first duly sworn, for him/herself and on behalf of the entity submitting this Proposal does hereby affirm and declare as follows:

- (1) He/She is of lawful age and is authorized to act on behalf of Bidder (the individual, partnership, corporation, entity, etc. submitting this Proposal) and that all statements made in this document are true and correct to the best of my knowledge.
- (2) If Bidder is operating under a fictitious name, Bidder has currently complied with any and all laws and procedures governing the operation of businesses under fictitious names in the State of Florida
- (3) No person or entity other than Bidder has any interest in this Proposal or in the Contract proposed to be entered into.
- (4) This Proposal is made without any understanding, agreement, or connection with any person or entity making Proposal for the same purposes, and is in all respects fair and without collusion or fraud.
- (5) Bidder is not in arrears to the City of Tampa, upon debt or contract, and is not a defaulter, as surety or otherwise, upon any obligation to the City of Tampa.
- (6) That no officer or employee or person whose salary is payable in whole or in part from the City Treasury is, shall be or become interested, directly or indirectly, as a contracting party, partner, stockholder, surety or otherwise, in this Proposal, or in the performance of the Contract, or in the supplies, materials, or equipment and work or labor to which it relates, or in any portion of the profits thereof.
- (7) Bidder has carefully examined and fully understands the Solicitation and has full knowledge of the scope, nature, and quality of the work to be performed; furthermore, Bidder has carefully examined the site of the work and that, from his own investigations, he has satisfied himself as to the nature and location of the work, the character, quality, and quantity of materials and the kinds and extent of equipment and other facilities needed for the performance of the work, the general and local conditions and all difficulties to be encountered, and all other items which may, in any way, affect the work or its performance.
- (8) Bidder (including its principals)  has |  has NOT been debarred or suspended from contracting with a public entity.
- (9) Bidder  has |  has NOT implemented a drug-free workplace program that meets the requirements of Section 287.087, Florida Statutes.
- (10) For bids \$1,000,000 and over;  The Bidder or its subcontractors participate in an apprenticeship program that is registered with the Florida Department of Education or the United States Department of Labor; or  Bidder commits that at the time it executes a construction contract that it or its subcontractors will be participating in such an apprenticeship program or an on-the-job training program; or  Bidder has submitted documentation that confirms, to the satisfaction of the City of Tampa, that there are no registered apprenticeship or on-the-job training programs for any work to be performed on the construction project.
- (11) Bidder has carefully examined and fully understands all the component parts of the Contract Documents and agrees Bidder will execute the Contract, provide the required Public Construction Bond, and will fully perform the work in strict accordance with the terms of the Contract and Contract Documents therein referred to for the following prices, to wit:

\* If a Partnership or Joint Venture, attach Partnership or Joint Venture Agreement.

\*\* Someone the City may contact with questions/correspondence regarding this Solicitation and/or permits.

Contract Item No.	Unit	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
BASE BID	LS		<p>The work includes the furnishing of all labor, equipment, and material for the renovation of restrooms and kitchen, teaching-areas, playground and yard areas, addition of a horizontal clerestory window, removal of security bars and replacement of windows with a hurricane rated system, renovation of the porch area, replacement/upgrade of the security and video surveillance systems, update the fire/life safety system to meet current code, replacement of the existing flooring, addition of a chiller, concrete pad and all related chiller piping, in accordance with the Contract Documents.</p> <p>_____ dollars and _____ cents</p>	
ITEM 2	LS	1	Contingency	\$ <u>50,000.00</u>
			TOTAL	\$ _____

Computed Total Price in Words: \_\_\_\_\_  
 \_\_\_\_\_ dollars and \_\_\_\_\_ cents.

Computed Total Price in Figures: \$ \_\_\_\_\_

Bidder acknowledges that the following addenda have been received and that the changes covered by the addendum(s) have been taken into account in this proposal: #1 \_\_\_\_ #2 \_\_\_\_ #3 \_\_\_\_ #4 \_\_\_\_ #5 \_\_\_\_ #6 \_\_\_\_ #7 \_\_\_\_ #8 \_\_\_\_.

Bidder acknowledges the requirements of the City of Tampa's Equal Business Opportunity Program.

Bidder acknowledges that it is aware of Florida's Trench Safety Act (Sections 553.60-553.64, Florida Statutes), and agrees that Bidder together with any involved subcontractors will comply with all applicable trench safety standards. Bidder further acknowledges that included in the various items of this Proposal and the total bid price (as applicable) are costs for complying with the Trench Safety Act. Bidder further identifies the costs and methods summarized below:

	<b>Trench Safety Measure (Description)</b>	<b>Unit of Measure (LF, SY)</b>	<b>Unit Quantity</b>	<b>Unit Cost</b>	<b>Extended Cost</b>
A.	_____	_____	_____	_____	_____
B.	_____	_____	_____	_____	_____
C.	_____	_____	_____	_____	_____
<b>Total Cost: \$</b>				_____	

Accompanying this Proposal is a certified check, cashier's check or Tampa Bid Bond (form included herein must be used) for at least five percent (5%) of the total amount of the Proposal which check shall become the property of the City, or which bond shall become forthwith due and payable to the City, if this Proposal shall be accepted by the City and the Bidder shall fail to enter into a legally binding contract with and to furnish the required Public Construction Bond to the City within twenty (20) days after the date of its receipt of written Notice of Award by the City so to do.

**FAILURE TO COMPLETE THE ABOVE MAY RESULT IN THE PROPOSAL BEING DECLARED NON-RESPONSIVE.**

[SEAL] Name of Bidder: \_\_\_\_\_  
 Authorized Signature: \_\_\_\_\_  
 Signer's Printed Name: \_\_\_\_\_  
 Signer's Title: \_\_\_\_\_

STATE OF \_\_\_\_\_  
 COUNTY OF \_\_\_\_\_

For an entity: The forgoing instrument was sworn (or affirmed) before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ by \_\_\_\_\_ as \_\_\_\_\_ of \_\_\_\_\_, a/n  Partnership  Joint Venture  LLC  Corp  Other: \_\_\_\_\_, on behalf of such entity. Such individual is  personally known to me or  produced a/n \_\_\_\_\_ state driver's license as identification.

For an individual: The forgoing instrument was sworn (or affirmed) before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ by \_\_\_\_\_, who is  personally known to me or  produced a/n \_\_\_\_\_ state driver's license as identification.

[NOTARY SEAL] Notary Public, State of \_\_\_\_\_  
 Notary Printed Name: \_\_\_\_\_  
 Commission No.: \_\_\_\_\_  
 My Commission Expires: \_\_\_\_\_

**Bidder's Statement Regarding  
Bidder's Criminal History Screening Practices:**

Pursuant to Sec. 2-284. - Bidder's Criminal History Screening Practices, the bidder declares as follows:

The Bidder hereby declines any discount or incentive related to Section 2-284 Bidder's Criminal History Screening Practices.

The Bidder hereby applies for applicable discount or incentive related to Section 2-284 Bidder's Criminal History Screening Practices. The following documentation and assurances are provided:

\_\_\_ Notarized past employment analysis that includes the number of disadvantaged workers the bidder has hired in the past, or, if the bidder has never hired a disadvantaged worker, an explanation that the bidder made a good faith effort to hire a disadvantaged worker: and,

\_\_\_ An estimate of the number of disadvantaged workers that the bidder has hired or plans to hire if the bidder is awarded the project; and,

\_\_\_ Evidence that the bidder's recruitment literature and employment policy does not include language that is disadvantageous to a disadvantaged worker.

\_\_\_ Identifies, [ ]hereon [ ]in attached document, potential job opportunities under the project that may be available for disadvantaged workers if the City awards the Bidder the project; and,

\_\_\_ Agrees to consider for job placement at least one otherwise qualified disadvantaged worker, to the extent a job opportunity is available, if and after the Bidder is awarded the project; or

\_\_\_ The Bidder currently employs a percentage of disadvantaged workers consistent with industry standards as determined by the director of the soliciting department or designee.

Signed \_\_\_\_\_

Date \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Firm \_\_\_\_\_

Project \_\_\_\_\_



# Good Faith Effort Compliance Plan Guidelines

for Women/Minority Business Enterprise/Small Local Business Enterprise Participation  
City of Tampa - Equal Business Opportunity Program  
(MBD Form 50 – detailed instructions on page 2 of 2)

Contract Name \_\_\_\_\_ Bid Date \_\_\_\_\_

Bidder/Proposer \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

The Compliance Plan with attachments is a true account of Good Faith Efforts (GFE) made to achieve the participation goals as specified for Women/Minority Business Enterprises/Small Local Business Enterprises (WMBE/SLBE) on the referenced contract:

The WMBE/SLBE participation **Goal is Met or Exceeded**. See DMI Forms 10 and 20 which accurately report all subcontractors solicited and all subcontractors to-be-utilized.

The WMBE/SLBE participation Goal is **Not Achieved**. The following list is an overview of the baseline GFE action steps already performed. Furthermore, it is understood that these GFE requirements are weighted in the compliance evaluation based on the veracity and demonstrable degree of documentation provided with the bid/proposal:

(Check applicable boxes below. Must enclose supporting documents accordingly with remarks)

- (1) Solicited through reasonable and available means the interest of WMBE/SLBEs that have the capability to perform the work of the contract. The Bidder or Proposer must solicit this interest within sufficient time to allow the WMBE/SLBEs to respond. The Bidder or Proposer must take appropriate steps to follow up initial solicitations with interested WMBE/SLBEs.  See DMI report forms for subcontractors solicited.  See enclosed supplemental data on solicitation efforts.  Qualifying Remarks:
- (2) Provided interested WMBE/SLBEs with adequate, specific scope information about the plans, specifications, and requirements of the contract, including addenda, in a timely manner to assist them in responding to the requested-scope identified by bidder/proposer for the solicitation.  See enclosed actual solicitations used.  Qualifying Remarks:
- (3) Negotiated in good faith with interested WMBE/SLBEs that have submitted bids (e.g. adjusted quantities or scale). Documentation of negotiation must include the names, addresses, and telephone numbers of WMBE/SLBEs that were solicited; the date of each such solicitation; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why agreements could not be reached with WMBE/SLBEs to perform the work. Additional costs involved in soliciting and using subcontractors is not a sufficient reason for a bidder/proposer's failure to meet goals or achieve participation, as long as such costs are reasonable. Bidders are not required to accept excessive quotes in order to meet the goal.  DMI Utilized Forms for sub-(contractor/consultant) reflect genuine negotiations  This project is an RFO/RFP in nature and negotiations are limited to clarifications of scope/specifications and qualifications.  See enclosed documentation.  Qualifying Remarks:
- (4) Not rejecting WMBE/SLBEs as being unqualified without justification based on a thorough investigation of their capabilities. The WMBE/SLBEs standing within its industry, membership in specific groups, organizations / associations and political or social affiliations are not legitimate causes for rejecting or not soliciting bids to meet the goals.  Not applicable.  See attached justification for rejection of a subcontractor's bid or proposal.  Qualifying Remarks:
- (5) Made scope(s) of work available to WMBE/SLBE subcontractors and suppliers; and, segmented portions of the work or material consistent with the available WMBE/SLBE subcontractors and suppliers, so as to facilitate meeting the goal.  Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion.  See enclosed comments.  Qualifying Remarks:
- (6) Made good faith efforts, despite the ability or desire of Bidder/Proposer to perform the work of a contract with its own forces/organization. A Bidder/Proposer who desires to self-perform the work of a contract must demonstrate good faith efforts if the goal has not been met.  Sub-Contractors were not prohibited from submitting bids/proposals and were solicited on work typically self-performed by the prime.  Qualifying Remarks:
- (7) Segmented portions of the work to be performed by WMBE/SLBEs in order to increase the likelihood that the goals will be met. This includes, where appropriate, breaking out contract work items into economically feasible units (quantities/scale) to facilitate WMBE/SLBE participation, even when the Bidder/Proposer might otherwise prefer to perform these work items with its own forces.  Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion.  Sub-Contractors were not prohibited from submitting bids/proposals and were solicited on work typically self-performed by the prime.  See enclosed comments.  Qualifying Remarks:
- (8) Made efforts to assist interested WMBE/SLBEs in obtaining bonding, lines of credit, or insurance as required by the city or contractor.  See enclosed documentation on initiatives undertaken and methods to accomplish.  Qualifying Remarks:
- (9) Made efforts to assist interested WMBE/SLBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, including participation in an acceptable mentor-protégé program.  See enclosed documentation of initiatives and/or agreements.  Qualifying Remarks:
- (10) Effectively used the services of the City and other organizations that provide assistance in the recruitment and placement of WMBE/SLBEs.  See enclosed documentation.  The following services were used:

Note: Provide any unsolicited information that will support the Bid/RFP Compliance Evaluation.  Named Documents Are:



**Participation Plan: Guidance for Complying with Good Faith Efforts Outreach**  
**(page 2 of 2)**

1. All firms on the WMBE/SLBE Goal Setting List must be solicited and documentation provided for email, fax, letters, phone calls, and other methods of outreach/communication with the listed firms. The DMI Solicited and DMI-Utilized forms must be completed for all firms solicited or utilized. Other opportunities for subcontracting may be explored by consulting the City of Tampa MBD Office and/or researching the on-line Diversity Management Business System Directory for Tampa certified WMBE/SLBE firms.
2. Solicitation of WMBE/SLBEs, via written or electronic notification, should provide specific information on the services needed, where plans can be reviewed and assistance offered in obtaining these, if required. Solicitations should be sent a minimum of a week (i.e. 5 business days or more) before the bid/proposal date. Actual copies of the bidder's solicitation containing their scope specific instructions should be provided.
3. With any quotes received, a follow-up should be made when needed to confirm detail scope of work. For any WMBE/SLBE low quotes rejected, an explanation shall be provided detailing negotiation efforts.
4. If a low bid WMBE/SLBE is rejected or deemed unqualified the contractor must provide an explanation and supporting documentation for this decision.
5. Prime shall break down portions of work into economical feasible opportunities for subcontracting. The WMBE/SLBE directory may be useful in identifying additional subcontracting opportunities and firms not listed in the "WMBE/SLBE Goal Setting Firms List."
6. Contractor shall not preclude WMBE/SLBEs from bidding on any part of work, even if the Contractor may desire to self-perform the work.
7. Contractor shall avoid relying solely on subcontracting out work-scope where WMBE/SLBE availability is not sufficient to attain the pre-determined subcontract goal set for the Bid or when targeted sub-consultant participation is stated within the RFP/RFQ.
8. In its solicitations, the Bidder should offer assistance to WMBE/SLBEs in obtaining bonding, insurance, et cetera, if required of subcontractors by the City or Prime Contractor.
9. In its solicitation, the Bidder should offer assistance in obtaining equipment for a specific job to WMBE/SLBEs, if needed.
10. Contractor should use the services offered by such agencies as the City of Tampa Minority and Small Business Development Office, Hillsborough County Entrepreneur Collaborative Center, Hillsborough County Economic Development Department's MBE/SBE Program and the NAACP Empowerment Center to name a few for the recruitment and placement of WMBEs/SLBEs.



**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**

**Page 1 of 4 – DMI Solicited/Utilized Schedules**  
**City of Tampa – Schedule of All Solicited Sub-(Contractors/Consultants/Suppliers)**  
**(FORM MBD-10)**

Contract No.: \_\_\_\_\_ Contract Name: \_\_\_\_\_  
Company Name: \_\_\_\_\_ Address: \_\_\_\_\_  
Federal ID: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Check applicable box(es). Detailed Instructions for completing this form are on page 2 of 4.

- No Firms were contacted or solicited for this contract.
- No Firms were contacted because: \_\_\_\_\_
- See attached list of additional Firms solicited and all supplemental information (List must comply to this form)  
**Note: Form MBD-10 must list ALL subcontractors solicited including Non-minority/small businesses**

NIGP Code Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

S = SLBE W=WMBE O = Neither	Company Name Address Phone, Fax, Email	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade or Services  NIGP Code (listed above)	Contact Method L=Letter F=Fax E=Email P=Phone	Quote or Response Received Y/N

Failure to Complete, Sign and Submit  
this form with your Bid or Proposal  
Shall render the Bid Non-Responsive  
(Do Not Modify This Form)

It is hereby certified that the information provided is an accurate and true account of contacts and solicitations for sub-contracting opportunities on this contract.

Signed: \_\_\_\_\_ Name/Title: \_\_\_\_\_ Date: \_\_\_\_\_

**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**  
**Forms must be included with Bid / Proposal**



## Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) Solicited Form (Form MBD-10)

**This form must be submitted with all bids or proposals.** All subcontractors (regardless of ownership or size) solicited and subcontractors from whom unsolicited quotations were received must be included on this form. The instructions that follow correspond to the headings on the form required to be completed. Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts to achieve participation.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business and/or doing business as (dba) if applicable.
- **Address.** The physical address of your business.
- **Federal ID. FIN.** A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Firms were contacted or solicited for this contract.** Checking the box indicates that a pre-determined Subcontract Goal or Participation Plan Requirement was not set by the City resulting in your business not using subcontractors and will self-perform all work. If during the performance of the contract you employ subcontractors, the City must pre-approve subcontractors. Use of the “Sub-(Contractors/Consultants/Suppliers) Payments” form (MBD Form-30) must be submitted with every pay application and invoice. Note: Certified **SLBE or WMBE firms** bidding as Primes **are not exempt** from outreach and solicitation of subcontractors.
- **No Firms were contacted because.** Provide brief explanation why no firms were contacted or solicited.
- **See attached documents.** Check box, if after you have completed the DMI Form in its entirety, you need more space to list additional firms and/or if you have supplemental information/documentation relating to the form. All DMI data not submitted on the MBD Form-10 must be in the same format and have all requested data from MBD Form-10 included.

The following instructions are for information of any and all subcontractors solicited.

- **“S” = SLBE, “W” = WMBE.** Enter “S” for firms Certified by the City as Small Local Business Enterprises and/or “W” for firms Certified by the City as either Women/Minority Business Enterprise; **“O” = Non-certified others.**
- **Federal ID. FIN.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification and payment of the contractor/subcontractor.
- **Company Name, Address, Phone & Fax.** Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials** indicate the trade, service, or materials provided by the subcontractor. NIGP codes aka “National Institute of Governmental Purchasing” are listed at top section of document.
- **Contact Method L=letter, F=fax, E=Email, P=Phone.** Indicate with letter the method(s) of soliciting for bid.
- **Quote or Resp. (response) Rec’d (received) Y/N.** Indicate “Y” Yes if you received a quotation or if you received a response to your solicitation. Indicate “N” No if you received no response to your solicitation from the subcontractor. Must keep records: log, ledger, documentation, etc. that can validate/verify.

If additional information is required or you have questions, please contact the Equal Business Opportunity Program - Minority and Small Business Development Office at (813) 274-5522.





**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**

**Page 3 of 4 – DMI Solicited/Utilized Schedules**  
**City of Tampa – Schedule of All To-Be-Utilized Sub-(Contractors/Consultants/Suppliers)**  
**(FORM MBD-20)**

Contract No.: \_\_\_\_\_ Contract Name: \_\_\_\_\_  
Company Name: \_\_\_\_\_ Address: \_\_\_\_\_  
Federal ID: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Check applicable box(es). Detailed Instructions for completing this form are on page 4 of 4.

See attached list of additional Firms Utilized and all supplemental information (List must comply to this form)

Note: Form MBD-20 must list ALL subcontractors To-Be-Utilized including Non-minority/small businesses

No Subcontracting/consulting (of any kind) will be performed on this contract.

No Firms are listed to be utilized because: \_\_\_\_\_

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

Enter "S" for firms Certified as Small Local Business Enterprises, "W" for firms Certified as Women/Minority Business Enterprise, "O" for Other Non-Certified

S = SLBE W=WMBE O =Neither	Company Name Address Phone, Fax, Email	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade, Services, or Materials  NIGP Code Listed above	\$ Amount of Quote. Letter of Intent (LOI) if available	Percent of Scope or Contract %

Failure to Complete, Sign and Submit  
this form with your Bid or Proposal  
Shall render the Bid Non-Responsive.  
(Do Not Modify This Form)

Total ALL Subcontract / Supplier Utilization \$ \_\_\_\_\_  
Total SLBE Utilization \$ \_\_\_\_\_  
Total WMBE Utilization \$ \_\_\_\_\_  
Percent SLBE Utilization of Total Bid/Proposal Amt. \_\_\_\_\_% Percent WMBE Utilization of Total Bid/Proposal Amt. \_\_\_\_\_%

It is hereby certified that the following information is a true and accurate account of utilization for sub-contracting opportunities on this Contract.

Signed: \_\_\_\_\_ Name/Title: \_\_\_\_\_ Date: \_\_\_\_\_

**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**  
**Forms must be included with Bid / Proposal**



## Page 4 of 4 DMI – Solicited/**Utilized**

### Instructions for completing **The Sub-(Contractors/Consultants/ Suppliers) to be Utilized Form (Form MBD-20)**

**This form must be submitted with all bids or proposals. All subcontractors (regardless of ownership or size) projected to be utilized must be included on this form.** Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts to achieve participation.

**Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.

- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business and/or doing business as (dba) if applicable.
- **Address.** The physical address of your business.
- **Federal ID. FIN.** A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Subcontracting/consulting (of any kind) will be performed on this contract.** Checking box indicates your business will not use subcontractors when no Subcontract Goal or Participation Plan Requirement was set by the City, but will self-perform all work. When subcontractors are utilized during the performance of the contract, the “Sub-(Contractors/Consultants/Suppliers) Payments” form (MBD Form-30) must be submitted with every pay application and invoice. Note: certified **SLBE or WMBE firms** bidding as Primes **are not exempt** from outreach and solicitation of subcontractors, including completion and submitting Form-10 and Form-20.
- **No Firms listed To-Be-Utilized.** Check box; provide brief explanation why no firms were retained when a goal or participation plan requirement was set on the contract. Note: mandatory compliance with Good Faith Effort outreach (GFECF) requirements applies (MBD Form-50) and supporting documentation must accompany the bid.
- **See attached documents.** Check box, if after completing the DMI Form in its entirety, you need more space to list additional firms and/or if you have supplemental information/documentation relating to the scope/value/percent utilization of subcontractors. Reproduce copies of MBD-20 and attach. All data not submitted on duplicate forms must be in the same format and content as specified in these instructions.

The following instructions are for information of Any and All subcontractors To Be Utilized.

- **Federal ID. FIN.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **“S” = SLBE, “W” = WMBE.** Enter “S” for firms Certified by the City as Small Local Business Enterprises and/or “W” for firms Certified by the City as Women/Minority Business Enterprise; **“O” = Non-certified others.**
- **Company Name, Address, Phone & Fax.** Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials (NIGP code if Known)** Indicate the trade, service, or material provided by the subcontractor. Abbreviated list of NIGP is available at <http://www.tampagov.net/mbd> “Information Resources”.
- **Amount of Quote, Letters of Intent** (required for both SLBEs and WMBEs).
- **Percent of Work/Contract.** Indicate the percent of the total contract price the subcontract(s) represent. For CCNA only (i.e. Consultant A/E Services) you must indicate subcontracts as percent of total scope/contract.
- **Total Subcontract/Supplier Utilization.** – Provide total dollar amount of all subcontractors/suppliers projected to be used for the contract. (Dollar amounts may be optional in CCNA depending on solicitation format).
- **Total SLBE Utilization.** Provide total dollar amount for all projected SLBE subcontractors/Suppliers used for this contract. (Dollar amounts may be optional in CCNA proposals depending on the solicitation format).
- **Total WMBE Utilization.** Provide total dollar amount for all projected WMBE subcontractors/Suppliers used for this contract. (Dollar amounts may be optional in CCNA proposals depending on the solicitation format).
- **Percent SLBE Utilization.** Total amount allocated to SLBEs divided by the total bid/proposal amount.
- **Percent WMBE Utilization.** Total amount allocated to WMBEs divided by the total bid/proposal amount.

If additional information is required or you have questions, please contact the Equal Business Opportunity Program - Minority and Small Business Development Office at (813) 274-5522.

TAMPA BID BOND  
Contract 20-C-00023; Kid Mason Community Center Renovation

KNOW ALL MEN BY THESE PRESENTS, that we, \_\_\_\_\_

\_\_\_\_\_  
(hereinafter called the Principal) and \_\_\_\_\_

(hereinafter called the Surety) a Corporation chartered and existing under the laws of the State of \_\_\_\_\_, with its principal offices in the City of \_\_\_\_\_, and authorized to do business in the State of Florida, are held and firmly bound unto the City of Tampa, a Municipal Corporation of Hillsborough County, Florida, in the full and just sum of 5% of the amount of the (Bid) (Proposal) good and lawful money of the United States of America, to be paid upon demand of the City of Tampa, Florida, to which payment will and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly these presents.

WHEREAS, the Principal is about to submit, or has submitted to the City of Tampa, Florida, a Proposal for the construction of certain facilities for the City designated Contract 20-C-00023, Kid Mason Community Center Renovation.

WHEREAS, the Principal desires to file this Bond in accordance with law, in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal be accepted, the Principal shall, within twenty (20) days after the date of receipt of written Notice of Award, execute a contract in accordance with the Proposal and upon the terms, conditions and price set forth therein, in the form and manner required by the City of Tampa, Florida and execute a sufficient and satisfactory Public Construction Bond payable to the City of Tampa, Florida in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to said City, then this Bid Bond obligation is to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount thereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Principal

\_\_\_\_\_

BY \_\_\_\_\_

TITLE \_\_\_\_\_

BY \_\_\_\_\_

TITLE \_\_\_\_\_

(SEAL)

\_\_\_\_\_  
Producing Agent

\_\_\_\_\_  
Producing Agent's Address

\_\_\_\_\_  
Name of Agency

\_\_\_\_\_  
The addition of such phrases as "not to exceed" or like import shall render the (Bid) (Proposal) non-responsive.

AGREEMENT

For furnishing all labor, materials and equipment, together with all work incidental thereto, necessary and required for the performance of the work for the construction of Contract 20-C-00023 in accordance with your Proposal dated \_\_\_\_\_, amounting to a total of \$ \_\_\_\_\_ as completed in accordance with subsections I-2.09 and I-2.10 of the Instruction to Bidders.

This AGREEMENT, made and entered into in triplicate, between the City of Tampa, Florida, hereinafter called the City, and \_\_\_\_\_ hereinafter called the Contractor, as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ when the City Council of the City of Tampa, Florida adopted a Resolution authorizing, among other things, the Mayor's execution of this Agreement.

WITNESSETH that, in consideration of the mutual stipulations, agreements, and covenants herein contained, the parties hereto have agreed and hereby agree with each other, the Party of the First Part for itself, its successors and assigns, and the Party of the Second Part for itself, or himself, or themselves, and its successors and assigns, or his or their executors, administrators and assigns, as follows:

Contract 20-C-00023; Kid Mason Community Center Renovation, shall include, but not be limited to, renovation of restrooms and kitchen, teaching-areas, playground and yard areas, addition of a horizontal clerestory window, removal of security bars and replacement of windows with a hurricane rated system, renovation of the porch area, replacement/upgrade of the security and video surveillance systems, update the fire/life safety system to meet current code, replacement of the existing flooring, addition of a chiller, concrete pad and all related chiller piping with all associated work required for a complete project in accordance with the Contract Documents.

Contract Documents referred to in Article 1.01 of this Agreement also includes this volume, applicable standard drawings, the plans and any provisions referred to whether actually attached or not.

# TAMPA AGREEMENT

## SECTION 1 GENERAL

### ARTICLE 1.01 THE CONTRACT

Except for titles, subtitles, headings, running headlines, and tables of contents (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, constitute the Contract:

The Notice to Bidders;  
The Instructions to Bidders, including Special Instructions and General Instructions;  
The Proposal;  
The Bid Bond;  
The Certification of Nonsegregated Facilities;  
The Notice of Award;  
The Agreement;  
The Performance Bond;  
The Notice To Proceed;  
The Specifications, including the General Provisions, the Workmanship and Materials, the Specific Provisions or the Contract Items  
The Plans;  
All Supplementary Drawings Issued after award of the Contract;  
All Addenda issued by the City prior to the receipt of proposals;  
All provisions required by law to be inserted in this Contract, whether actually inserted or not.

### ARTICLE 1.02 DEFINITIONS

The following words and terms, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless different meaning is clear from the context:

(a)"City" shall mean the City of Tampa, Florida, represented by its Mayor and City Council, Party of the First Part, or such other City official as shall be duly empowered to act for the City on matters relating to this Contract.

(b)"Contractor" shall mean the Party of the Second Part hereto, whether corporation, firm or individual, or any combination thereof, and its, their, or his successors, personal representatives, executors, administrators, and assigns, and any person, firm or corporation who or which shall at any time be substituted in the place of the Party of the Second Part under this Contract.

(c)"Engineer" shall mean the Director of the Department or his duly authorized representative.

(d)"Consultant" shall mean the engineering or architectural firm or individual employed by the City to consult with and advise the City in the construction of the project.

(e)"Surety" shall mean any person, firm or corporation that has executed as Surety the Contractor's Performance Bond securing the performance of this Contract.

(f)"The Work" shall mean everything expressly or implied required to be furnished and done by the Contractor under the Contract, and shall include both Contract Work

and Extra Work.

(g)"Contract Work" shall mean everything expressly or implied required to be furnished and done by the Contractor by any one or more of the Contract parts referred to in Article 1.01 hereof, except Extra Work, as hereinafter defined; it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Engineer shall determine which shall prevail.

(h)"Contract" or "Contract Documents" shall mean each of the various part of the Contract referred to in Article 1.01 hereof, both as a whole and severally.

(i)"Extra Work" shall mean work other than that required either expressly or implied by the contract in its present form.

(j)"Plans" shall mean only those drawings specifically referred to as such in these documents, or in any Addendum. Drawings issued after the execution of the Contract to explain further, or to illustrate, or to show changes in the work, will be known as "Supplementary Drawings" and shall be binding upon the Contractor with the same force as the Plans.

(k)"Specifications" shall mean all of the directions, requirements, and standards of performance applying to the work, as hereinafter detailed and designated as such, or which may be issued in an addendum.

(l)"Addendum or Addenda" shall mean the additional contract provisions issued in writing prior to the receipt of bids.

(m)"Notice" shall mean written notice. Notice shall be served upon the Contractor, either personally or by leaving the said notice at his residence or with any employee found on the work, or addressed to the Contractor at the residence or place of business given in his proposal and deposited in a postpaid wrapper in any post office box regularly maintained by the United States Post Office.

(n)"Project" shall mean the entire improvement package or related work. The "project" may consist of several different, but related, contracts.

(o)"Site" shall mean, and be limited to, the area upon or in which the Contractor's operations are carried on and such other appropriate areas as may be designed as such by the Engineer.

(p)"Subcontractor" shall mean any person, firm, or corporation, other than employees of the Contractor, who or which contracts with the Contractor to furnish, or actually furnishes labor, or labor and materials, or labor and equipment or labor, materials, and equipment at the site.

(q)Whenever in the Contract the words "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import are used, they shall imply the direction, requirement, permission, order, designation, or prescription of the Engineer; and "approved", "acceptable", "satisfactory", "in the judgement of", and words of like import shall mean approved by, or acceptable to, or satisfactory to, or in the judgment of the Engineer.

(r)Whenever in the Contract the word "day" is used, it shall mean calendar day.

(s)"Final Acceptance" shall mean acceptance of the

work as evidenced by an official resolution of the City. Such acceptance shall be deemed to have taken place only if and when an approving resolution has been adopted by the City Council. The final acceptance shall be signed only after the City has assured itself by tests, inspection, or otherwise, that all of the provisions of the Contract have been carried out to its satisfaction.

(t)"Eastern Standard Time" shall be construed as the time being observed in the City on the day proposals are received or other documents issued or signed.

## **SECTION 2 POWERS OF THE CITY'S REPRESENTATIVES**

### **ARTICLE 2.01 THE ENGINEER**

It is covenanted and agreed that the Engineer, in addition to those matters elsewhere herein expressly made subject to his determination, direction, or approval, shall have the power, subject to such express provisions and limitations herein contained as are not in conflict herewith, and subject to review by the Mayor and City Council:

(a)To monitor the performance of the work.

(b)To determine the amount, kind, quality, sequence, and location of the work to be paid for hereunder and, when completed, to measure such work for payment.

(c)To determine all questions of an engineering character in relation to the work, to interpret the Plans, Specifications and Addenda.

(d)To determine how the work of this Contract shall be coordinated with the work of other contractors engaged simultaneously on this project.

(e)To make minor changes in the work as he deems necessary, provided such changes do not result in a net increase in the cost to the City or to the Contractor of the work to be done under the Contract.

(f)To amplify the Plans, add explanatory information and furnish additional Specifications and Drawings consistent with the intent of the Contract Documents.

The power of the Engineer shall not be limited to the foregoing enumeration, for it is the intent of this Contract that all of the work shall be subject to his determinations and approval, except where the determination or approval of someone other than the Engineer is expressly called for herein and except as subject to review by the Mayor and City Council. All orders of the Engineer requiring the Contractor to perform work as Contract work shall be promptly obeyed by the Contractor.

The Engineer shall not, however, have the power to issue an extra work order, and the performance of such work on the order of the Engineer without previously obtaining written confirmation thereof from the Mayor in accordance with Article 7.02 hereof may constitute a waiver of any right to extra compensation therefor. The Contractor is warned that the Engineer has no power to change the terms and provisions of this Contract, except minor changes where such change results in no net increase in the Contract Price.

### **ARTICLE 2.02 DIRECTOR**

The Director of the Department in addition to those matters

expressly made subject to his determination, direction or approval in his capacity as "Engineer", shall also have the power:

(a)To review any and all questions in relation to this Contract and its performance, except as herein otherwise specifically provided, and his determination upon such review shall be final and conclusive upon the Contractor.

(b)With the approval of the Mayor and City Council to authorize modifications or changes in the Contract so as to require: (1) the performance of extra work, or (2) the omission of Contract work whenever he deems it in the interest of the City to do so, or both.

(c)To suspend the whole or any part of the work whenever, in his judgment, such suspension is required: (1) in the interest of the City generally, or (2) to coordinate the work of the various Contractors engaged on this project, or (3) to expedite the completion of the entire project, even though the completion of this particular Contract may be thereby delayed, without compensation to the Contractor for such suspension other than extending the time for the completion of the work, as much as it may have been, in the opinion of the City, delayed by such a suspension.

(d)If, before the final acceptance of all the work contemplated herein, it shall be deemed necessary to take over, use, occupy, or operate any part of the completed or partly completed work, the Engineer shall have the right to do so and the Contractor will not, in any way, interfere with or object to the use, occupation, or operation of such work by the City after receipt of notice in writing from the Engineer that such work or part thereof will be used by the City on and after the date specified in such notice. Such taking over, use, occupancy or operation of any part of the completed or partially completed work shall not constitute final acceptance or approval of any such part of the work.

### **ARTICLE 2.03 NO ESTOPPEL**

The City shall not, nor shall any department, officer, agent, or employee thereof, be bound, precluded, or estopped by any determination, decision, acceptance, return, certificate, or payment made or given under or in connection with this Contract by any officer, agent or employee of the City at any time either before or after final completion and acceptance of the work and payment therefor: (a) from showing the true and correct classification, amount, quality, or character of the work done, or that any determination, decision, acceptance, return certificate or payment is untrue, incorrect or improperly made in any particular, or that the work or any part thereof does not in fact conform to the requirements of the Contract Documents, and (b) from demanding and recovering from the Contractor any overpayments made to him or such damages as it may sustain by reason his failure to comply with the requirements of the Contract of Documents, or both.

### **ARTICLE 2.04 NO WAIVER OF RIGHTS**

Neither the inspection, nor any order, measurements or certificate of the City or its employees, officers, or agents, nor by any order of the City for payment of money, nor any money, nor payments for or acceptance of the whole or any part of the work by the City, nor any extension of time, nor any changes in the Contract, Specifications or Plans, nor any possession by the City or its employees shall operate as a

waiver of any provisions of this Contract, nor any power herein provided nor shall any waiver of any breach of this Contract be held as a waiver of any other subsequent breach.

Any remedy provided in this Contract shall be taken and construed as cumulative, namely, in addition to each and every other suit, action, or legal proceeding. The City shall be entitled as of right to an injunction against any breach of the provisions of this Contract.

### **SECTION 3 PERFORMANCE OF WORK**

#### **ARTICLE 3.01 CONTRACTOR'S RESPONSIBILITY**

The Contractor shall do all the work and furnish, at his own cost and expense, all labor, materials, equipment, and other facilities, except as herein otherwise provided, as may be necessary and proper for performing and completing the work under this Contract. The Contractor shall be responsible for the entire work until completed and finally accepted by the City.

The work shall be performed in accordance with the true intent and meaning of the Contract Documents. Unless otherwise expressly provided, the work must be performed in accordance with the best modern practice, with materials as specified and workmanship of the highest quality, all as determined by and entirely to the satisfaction of the Engineer.

Unless otherwise expressly provided, the means and methods of construction shall be such as the Contractor may choose, subject, however, to the approval of the Engineer. Only adequate and safe procedure, methods, structures and equipment shall be used. The Engineer's approval or the Engineer's failure to exercise his right thereon shall not relieve the Contractor of obligations to accomplish the result intended by the Contract, nor shall such create a cause of action for damages.

#### **ARTICLE 3.02 COMPLIANCE WITH LAWS**

The Contractor must comply with all local, State and Federal laws, rules, ordinances and regulations applicable to this Contract and to the work done hereunder, and must obtain, at his own expense, all permits, licenses or other authorization necessary for the prosecution of the work.

No work shall be performed under this Contract on Sundays, legal holidays or after regular working hours without the express permission of the Engineer. Where such permission is granted, the Engineer may require that such work be performed without additional expense to the City.

#### **ARTICLE 3.03 INSPECTION**

During the progress of the work and up to the date of final acceptance, the Contractor shall, at all times, afford the representatives of the City, the Florida Department of Environmental Regulation, and if applicable, the Federal Environmental Protection Agency and the Federal Department of Labor every reasonable, safe and proper facility for inspecting the work done or being done at the

site. The inspection of any work shall not relieve the Contractor of any of his obligations to perform proper and satisfactory work as herein specified. Finished or unfinished work found not to be in strict accordance with the Contract shall be replaced as directed by the Engineer, even though such work may have been previously approved and payment made therefor.

The City shall have the right to reject materials and workmanship which are defective or require their correction. Rejected work and materials must be promptly removed from the site, which must at all times be kept in a reasonably clean and neat condition.

Failure or neglect on the part of the City to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the City. Neither shall it be construed as barring the City at any subsequent time from the recovery of damages of such a sum of money as may be needed to build anew all portions of the work in which inferior work or improper materials were used, wherever found.

Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make examinations of work already completed, by removing or tearing out all or portions of such work, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material for that purpose. If such work is found to be defective in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the work shall be considered an item of extra work to be paid for in accordance with the provisions of Article 7.02 hereof.

#### **ARTICLE 3.04 PROTECTION**

During performance and until final acceptance, the Contractor shall be under an absolute obligation to protect the finished and unfinished work against any damage, loss, or injury. The Contractor shall take proper precaution to protect the finished work from loss or damage, pending completion and the final acceptance of all the work included in the entire Contract, provided that such precaution shall not relieve the Contractor from any and all liability and responsibility for loss or damage to the work occurring before final acceptance by the City. Such loss or damage shall be at the risk of and borne by the Contractor, whether arising from acts or omissions of the Contractor or others. In the event of any such loss or damage, the Contractor shall forthwith repair, replace, and make good the work without extension of time therefor, except as may be otherwise provided herein.

The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the Contractor or the City.

#### **ARTICLE 3.05 PRESERVATION OF PROPERTY**

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in anywise affected by the work, the removal or destruction of which is not called for by the Plans. This applies, but is not limited, to the public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, public streets (except natural wear and tear of streets resulting from legitimate use thereof by the Contractor), and wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor and at his own expense.

In case of failure on the part of the Contractor to restore such property, or make good such damage or injury, the City may, upon forty-eight (48) hour written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under this Contract. Nothing in this clause shall prevent the Contractor from receiving proper compensation for the removal, damage, or replacement of any public or private property not shown on the Plans, when this is made necessary by alteration of grade or alignment authorized by the Engineer, provided that such property has not been damaged through fault of the Contractor, his employees or agents.

**ARTICLE 3.06 BOUNDARIES**

The Contractor shall confine his equipment, apparatus, the storage of materials, supplies and apparatus of his workmen to the limits indicated on the plans, by law, ordinances, permits or direction of the Engineer.

**ARTICLE 3.07 SAFETY AND HEALTH REGULATIONS**

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL91-54).

**ARTICLE 3.08 TAXES**

All taxes of any kind and character payable on account of the work done and materials furnished under this Contract shall be paid by the Contractor and shall be deemed to have been included in his bid. The laws of the State of Florida provide that sales and use taxes are payable by the Contractor upon the tangible personal property incorporated in the work and such taxes shall be paid by the Contractor and shall be deemed to have been included in his bid.

**ARTICLE 3.09 ENVIRONMENTAL CONSIDERATIONS**

The Contractor, in the performance of the work under this Contract, shall comply with all Local, State and Federal laws, statutes, ordinances, rules and regulations applicable to protection of the environment; and, in the event he violates any of the provisions of same, he shall be answerable to the Local, State and Federal agencies designated by law to protect the environment. In the event the City receives, from any of the environmental agencies, a citation which is occasioned by an act or omission of the Contractor or his

subcontractor or any officers, employees or agents of either, it is understood and agreed that the Contractor shall automatically become a party-respondent under said citation; and the City immediately shall notify the Contractor and provide him with a copy of said citation.

The Contractor shall comply with the requirements of the citation and correct the offending conditions(s) within the time stated in said citation and further shall be held fully responsible for all fines and/or penalties.

**SECTION 4  
TIME PROVISIONS**

**ARTICLE 4.01 TIME OF START AND COMPLETION**

The Contractor must commence work within thirty (30) days subsequent to the date of the receipt of the "Notice to Proceed" by the City unless otherwise provided in the Specific Provisions and Special Instructions. Time being of the essence of this Contract, the Contractor shall thereafter prosecute the work diligently, using such means and methods of construction as well as secure its full completion in accordance with the requirements of the Contract Documents no later than the date specified therefor, or on the date to which the time for completion may be extended.

The Contractor must complete the work covered by this Contract in the number of consecutive calendar days set forth in the Instructions to Bidders, unless the date of completion is extended pursuant to the provisions of Article 4.05 hereof.

The period for performance shall start from the date of signing of this Agreement by the City.

The actual date of completion will be established after a final inspection as provided in Article 4.07 hereof.

**ARTICLE 4.02 PROGRESS SCHEDULE**

To enable the work to be laid out and prosecuted in an orderly and expeditious manner, the Contractor shall submit to the Engineer a proposed progress schedule within fifteen (15) days after the award of this Contract.

The schedule shall state the Contract starting date, time for completion and date of completion and shall show the anticipated time of starting and completion of each of the various operations to be performed under this Contract, together with all necessary and appropriate information regarding sequence and correlation of work and an estimated time required for the delivery of all materials and equipment required for the work. The proposed schedule shall be revised as directed by the Engineer until finally approved by him, and, after such approval, shall be strictly adhered to by the Contractor. The approved progress schedule may be changed only with the written permission of the Engineer.

If the Contractor shall fail to adhere to the approved progress schedule or the schedule as revised, he shall promptly adopt such other or additional means and methods of construction as will make up for the time lost, and will assure completion in accordance with the contract time.



**ARTICLE 4.03 APPROVAL REQUESTS**

From time to time, as the work progresses and in the sequence indicated by the approved schedule, the Contractor must submit to the Engineer a specific request, in writing, for each item of information or approval required of him by the Contract. These requests must be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow for the time the Engineer may take to act upon such submissions or resubmissions. The Contractor shall not have any right to an extension of time on account of delays due to his failure to submit his requests for the required information or the required approval in accordance with these requirements.

**ARTICLE 4.04 COORDINATION WITH OTHER CONTRACTORS**

During progress of the work, other Contractors may be engaged in performing other work on this project or on other projects on the site. In that event, the Contractor shall coordinate the work to be done hereunder with the work of such other Contractors in such manner as the Engineer may direct.

**ARTICLE 4.05 EXTENSION OF TIME**

If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work should the Contractor be obstructed or delayed in the commencement, prosecution or completion of any part of said work by any act or delay of the City, or by acts or omissions of other Contractors on this project, or by a riot, insurrection, war, pestilence, acts of public authorities, fire, lightning, hurricanes, earthquakes, tornadoes, floods, extremely abnormal and excessive inclement weather as indicated by the records of the local weather bureau for a five-year period preceding the date of the Contract, or by strikes, or other causes, which causes of delay mentioned in this Article, in the opinion of the City, are entirely beyond the expectation and control of the Contractor.

The Contractor shall, however, be entitled to an extension of time for such causes only for the number of days of delay which the City may determine to be due solely to such causes and only to the extent that such occurrences actually delay the completion of the project and then only if the Contractor shall have strictly complied with all of the requirements of Articles 4.01, 4.02, 4.03 and 4.04 hereof. It is hereby understood that the determination by the Engineer as to the order and sequence of the work shall not in itself constitute a basis for extension of time.

The determination made by the City on an application for an extension of time shall be binding and conclusive on the Contractor.

Delays caused by failure of the Contractor's materialmen, manufacturers, and dealers to furnish approved working drawings, materials, fixtures, equipment, appliances, or other fittings on time or failure of subcontractors to perform their work shall not constitute a basis of extension of time.

The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any

act or omission to act of the City or any of its representatives or because of any injunction which may be brought against the City or its representatives and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work as provided herein.

**ARTICLE 4.06 LIQUIDATED DAMAGES**

It is mutually agreed between the parties that time is the essence of this Contract and that there will be on the part of the City considerable monetary damage in the event the Contractor should fail to complete the work within the time fixed for completion in the Contract or within the time to which such completion may have been extended.

The amount per day set forth in the Instructions to Bidders is hereby agreed upon as the liquidated damages for each and every calendar day that the time consumed in completing the work under this Contract exceeds the time allowed.

This amount shall, in no event, be considered as a penalty or otherwise than as the liquidated and adjusted damages to the City because of the delay and the Contractor and his Surety agree that the stated sum per day for each such day of delay shall be deducted and retained out of the monies which may become due hereunder and if not so deductible, the Contractor and his Surety shall be liable therefor.

**ARTICLE 4.07 FINAL INSPECTION**

When the work has been completed in accordance with the requirements of the Contract and final cleaning up performed, a date for final inspection of the work by the Engineer shall be set by the Contractor in a written request therefor, which date shall be not less than ten (10) days after the date of such request. The work will be deemed complete as of the date so set by the Contractor if, upon such inspection, the Engineer determines that no further work remains to be done at the site.

If such inspection reveals interms of work still to be performed, however, the Contractor shall promptly perform them and then request a reinspection. If, upon such inspection, the Engineer determines that the work is complete, the date of final completion shall be deemed to be the last day of such reinspection.

**SECTION 5  
SUBCONTRACTS AND ASSIGNMENTS**

**ARTICLE 5.01 LIMITATIONS AND CONSENT**

The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, or his power to execute such Contract, or to assign any monies due or to become due thereunder to any other person, firm or corporation unless the previous written consent of the City shall first be obtained thereto and the giving of any such consent to a particular subcontract or assignment shall not dispense with the necessity of such consent to any further or other assignment.

Before making any subcontract, the Contractor must submit a

written statement to the Engineer, giving the name and address of the proposed contractor, the portion of the work and materials which he is to perform and furnish and any other information tending to prove that the proposed subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and conditions of this Contract.

If the City finds that the proposed subcontractor is qualified, the Contractor will be notified in writing. The City may revoke approval of any subcontractor when such subcontractor evidences an unwillingness or inability to perform his work in strict accordance with these Contract Documents. Notice of such revocation of approval will be given in writing to the Contractor.

The Contractor will promptly, upon request, file with the City a conformed copy of the subcontract. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of these Contract Documents, insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontracts that the City may exercise over the Contractor under provisions of these Contract Documents.

The Contractor shall be required to perform with his own forces at least twenty-five (25) percent of the work, unless written consent to subcontract a greater percentage of the work is first obtained from the City.

**ARTICLE 5.02 RESPONSIBILITY**

The approval by the City of a subcontractor shall not relieve the Contractor of any of his responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible to the City for the acts or defaults or omissions of his subcontractor and of such subcontractor's officers, agents, and employees, each of whom shall for all purposes be deemed to be the agent or employee of the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the City.

**SECTION 6  
SECURITY AND GUARANTY**

**ARTICLE 6.01 CONTRACT SECURITY**

The Contractor shall execute and deliver to the City a Performance Bond on the form as provided herein, in an amount at least equal to one hundred (100) percent of the full Contract price, such Bond to be executed by a surety company acceptable to the City. The surety on such Performance Bond shall be a surety company duly authorized to do business in the State of Florida, and the Bond shall be issued or countersigned by a local resident producing agent of such surety company who is a resident of the State of Florida, regularly commissioned and licensed in said State, and satisfactory evidence of the authority of the person or persons executing such Bond shall be submitted with the Bond. The Performance Bond shall serve as security for the faithful performance of this Contract, including

maintenance and guaranty provisions, and for the payment of all persons performing labor and furnishing materials in connection with the Contract. The premiums on the Performance Bond shall be paid by the Contractor.

If, at any time, the City shall become dissatisfied with any surety or sureties then upon the Performance Bond, or if for any other reason such bond shall cease to be adequate security for the City, the Contractor shall, within five days after notice so to do, substitute an acceptable Bond in such form and sum and signed by such other sureties as may be satisfactory to the City. The premiums on such Bond shall be paid by the Contractor. No further partial payments shall be deemed due or shall be made until the new sureties have qualified.

**ARTICLE 6.02 CONTRACTORS INSURANCE**

Insurance required shall be as indicated on Special Instructions pages beginning with "INS-1"

**ARTICLE 6.03 AGAINST CLAIMS AND LIENS**

The City may withhold from the Contractor as much as any approved payments to him as may, in the opinion of the City, be necessary to secure (a) just claims of any persons supplying labor or materials to the Contractor or any of his subcontractors for the work then due and unpaid; (b) loss due to defective work not remedied, or (c) liability, damage, or loss due to injury to persons or damages to the work or property of other contractors, subcontractors, or others, caused by the act or neglect of the Contractor or of any of his subcontractors. The City shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the City may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payments for the account of the Contractor.

**ARTICLE 6.04 MAINTENANCE AND GUARANTY**

The Contractor hereby guarantees all the work furnished under this Contract against any defects in workmanship and materials for a period of one year following the date of final acceptance of the work by the City. Under this guarantee, the Contractor hereby agrees to make good, without delay, at his own expense, any failure of any part of the work due to faulty materials or manufacture, construction, or installation, or the failure of any equipment to perform satisfactorily all the work put upon it within the limits of the Contract Documents, and further, shall make good any damage to any part of the work caused by such failure. It is hereby agreed that the Performance Bond shall fully cover all guarantees contained in this Article.

It is also agreed that all warranties, expressed or implied, inure to the benefit of the City and are enforceable by the City.

**SECTION 7  
CHANGES**

**ARTICLE 7.01 MINOR CHANGES**

The City reserves the right to make such additions, deductions, or changes to this Contract from time to time as

it deems necessary and in a manner not materially affecting the substance thereof or materially changing the price to be paid in order to carry out and complete more fully and perfectly the work herein agreed to be done and performed. This Contract shall in no way be invalidated by any such additions, deductions, or changes, and no claim by the Contractor shall be made for any loss of anticipated profits thereby.

Construction conditions may require that minor changes be made in the location and installation of the work and equipment to be furnished and other work to be performed hereunder, and the Contractor when ordered by the Engineer, shall make such adjustments and changes in said locations and work as may be necessary, without additional cost to the City, provided such adjustments and changes do not alter the character, quantity of cost of the work as a whole, and provided further that Plans and Specifications showing such adjustments and changes are furnished to the Contractor by the City within a reasonable time before any work involving such adjustment and changes is begun. The Engineer shall be the sole judge of what constitutes a minor change for which no additional compensation shall be allowed.

#### **ARTICLE 7.02 EXTRA WORK**

The City may at any time by a written order and without notice to the sureties require the performance of such extra work as it may find necessary or desirable. An order for extra work shall be valid only if issued in writing and signed by the Mayor and the work so ordered must be performed by the Contractor.

The amount of compensation to be paid to the Contractor for any extra work as so ordered shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Proposal; or

(b) If no such unit prices are set forth then by a lump sum or other unit prices mutually agreed upon by the City and the Contractor; or

(c) If no such unit prices are set forth in the Proposal and if the parties cannot agree upon a lump sum or other unit prices then by the actual net cost in money to the Contractor of the extra work performed, which cost shall be determined as follows:

(1) For all labor and foreman in direct charge of the authorized operations, the Contractor shall receive the current local rate of wages to be agreed upon, in writing, before starting such work for each hour that said labor and foremen are actually engaged thereon, to which shall be added an amount equal to 25 percent of the sum thereof which shall be considered and accepted as full compensation for general supervision, FICA taxes, contributions under the Florida Unemployment Compensation Act, insurance, bond, subcontractor's profit and overhead, the furnishing of small tools and miscellaneous equipment used, such as picks, shovels, hand pumps, and similar items.

(2) For all materials used, the Contractor shall receive the actual cost of such materials delivered at the site or previously approved delivery point as established by original receipted bills. No percentage shall be added to this cost.

(3) For special equipment and machinery such as power-driven pumps, concrete mixers, trucks, and tractors, or other equipment, required for the economical performance of the authorized work, the Contractor shall receive payment based on the average local area rental price for each item of equipment and the actual time of its use on the work. No percentage shall be added to this sum.

(4) Records of extra work done under this procedure shall be reviewed at the end of each day by the Contractor or his representative and the Engineer. Duplicate copies of accepted records shall be made and signed by both Contractor or his representative and the Engineer, and one copy retained by each.

Request for payment for approved and duly authorized extra work shall be submitted in the same form as Contract work or in the case of work performed under paragraph (c) (1) above upon a certified statement supported by receipted bills. Such statement shall be submitted for the current Contract payment for the month in which the work was done.

#### **ARTICLE 7.03 DISPUTED WORK**

If the Contractor is of the opinion that any work required, necessitated, or ordered violates the terms and provisions of this Contract, he must promptly notify the Engineer, in writing, of his contentions with respect thereto and request a final determination thereof. If the Engineer determines that the work in question is Contract work and not extra work or that the order complained of is proper, he will direct the Contractor to proceed and the Contractor shall promptly comply. In order, however, to reserve his right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within five (5) days after receiving notice of the Engineer's determination and direction, notify the City in writing that the work is being performed or that the determination and direction is being complied with under protest. Failure of the Contractor to notify shall be deemed as a waiver of claim for extra compensation or damages therefor.

Before final acceptance by the City, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Final determinations and decisions, in case any questions shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefor until the matter in question has been adjusted.

#### **ARTICLE 7.04 OMITTED WORK**

The City may at any time by a written order and without notice to the sureties require the omission of such Contract work as it may find necessary or desirable.

An order for omission of work shall be valid only if signed by the Mayor and the work so ordered must be omitted by the Contractor. The amount by which the Contract price shall be reduced shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Contract; or

(b) By the appropriate lump sum price set forth in the Contract; or

(c) By the fair and reasonable estimated cost to the City

of such omitted work as determined by the Engineer and approved by the City.

## **SECTION 8 CONTRACTOR'S EMPLOYEES**

### **ARTICLE 8.01 CHARACTER AND COMPETENCY**

The Contractor and his subcontractors shall employ upon all parts of the work herein contracted for only competent, skillful, and trustworthy workers. Should the Engineer at any time give notice, in writing, to the Contractor or his duly authorized representative on the work that any employee in his opinion is incompetent, unfaithful, disorderly, careless, unobservant of instructions, or in any way a detriment to the satisfactory progress of the work, such employee shall immediately be dismissed and not again allowed upon the site.

### **ARTICLE 8.02 SUPERINTENDENCE**

The Contractor shall give his personal supervision to the faithful prosecution of the work and in case of his absence shall have a competent, experienced, and reliable supervisor or superintendent, acceptable to the Engineer on the site who shall follow without delay all instructions of the Engineer in the prosecution and completion of the work and every part thereof, in full authority to supply workers, material, and equipment immediately. He shall keep on hand at all times copies of the Contract Documents.

### **ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES**

The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination regarding race, creed, color, sex or national origin and must not maintain or provide facilities that are segregated on the basis of race, color, creed or national origin.

### **ARTICLE 8.04 RATES OF WAGES**

On federally assisted projects, the rates of wages to be paid under this Contract shall not be less than the rates of wages set forth in Section 12 of this Agreement.

On other projects, no wage rate determination is included. Florida's Prevailing Wage Law (Section 215.19, Florida Statutes) was repealed effective April 25, 1979.

### **ARTICLE 8.05 PAYROLL REPORTS**

The Contractor and each subcontractor shall, if requested to do so, furnish to the Engineer a duly certified copy of his payroll and also any other information required by the Engineer to satisfy him that the provisions of the law as to the hours of employment and rate of wages are being observed.

Payrolls shall be prepared in accordance with instructions furnished by the City and on approved forms. The Contractor shall not carry on his payroll any persons not employed by him. Subcontractor's employees shall be carried only on the payrolls of the employing subcontractor.

## **SECTION 9 CONTRACTOR'S DEFAULT**

### **ARTICLE 9.01 CITY'S RIGHT AND NOTICE**

It is mutually agreed that: (a) if the Contractor fails to begin work when required to do so, or (b) if at any time during the progress of the work it shall appear to the Engineer that the Contractor is not prosecuting the work with reasonable speed, or is delaying the work unreasonably and unnecessarily, or (c) if the force of workmen or quality or quantity of material furnished are not sufficient to insure completion of the work within the specified time and in accordance with the Specifications hereto attached, or (d) if the Contractor shall fail to make prompt payments for materials or labor or to subcontractors for work performed under the Contract, or (e) if legal proceedings have been instituted by others than the City in such manner as to interfere with the progress of the work and may subject the City to peril of litigation or outside claims of (f) if the Contractor shall be adjudged a bankrupt or make an assignment for the benefit of creditors, or (g) if in any proceeding instituted by or against the Contractor an order shall be made or entered granting an extension of time of payment, composition, adjustment, modification, settlement or satisfaction of his debts or liabilities, or (h) if a receiver or trustee shall be appointed for the Contractor or the Contractor's property, or (i) if the Contract or any part thereof shall be sublet without the consent of the City being first obtained in writing, or (j) if this Contract or any right, monies, or claim thereunder shall be assigned by the Contractor, otherwise than as herein specified, or (k) if the Contractor shall fail in any manner of substance to observe the provisions of this Contract, or (l) if any of the work, machinery, or equipment shall be defective, and shall not be replaced as herein provided, or (m) if the work to be done under this Contract shall be abandoned, then such fact or conditions shall be certified by the Engineer and thereupon the City without prejudice to any other rights or remedies of the City, shall have the right to declare the Contractor in default and so notify the Contractor by a written notice, setting forth the ground or grounds upon which such default is declared and the Contractor must discontinue the work, either as a portion of the work or the whole thereof, as directed.

### **ARTICLE 9.02 CONTRACTOR'S DUTY UPON DEFAULT**

Upon receipt of notice that his Contract is in default, the Contractor shall immediately discontinue all further operations on the work or such part thereof, and shall immediately quit the site or such part thereof, leaving untouched all plant, materials, equipment, tools, and supplies.

### **ARTICLE 9.03 COMPLETION OF DEFAULTED WORK**

The City, after declaring the Contractor in default, may then have the work completed or the defective equipment or machinery replaced or anything else done to complete the work in strict accordance with the Contract Documents by such means and in such manner, by Contract with or without public letting, or otherwise, as it may deem advisable,

utilizing for such purpose without additional cost to the City such of the Contractor's plant, materials, equipment, tools, and supplies remaining on the site, and also such subcontractors as it may deem advisable.

The City shall reimburse all parties, including itself, for the expense of such completion, including liquidated damages, if any, and the cost of reletting. The City shall deduct this expense from monies due or to become due to the Contractor under this Contract, or any part thereof, and in case such expense is more than the sum remaining unpaid of the original contract price, the Contractor and his sureties shall pay the amount of such deficiency to the City.

#### **ARTICLE 9.04 PARTIAL DEFAULT**

In case the City shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractor or person whom the City may engage to complete the work as to which the Contractor was declared in default.

### **SECTION 10 PAYMENTS**

#### **ARTICLE 10.01 PRICES**

For the Contractor's complete performance of the work, the City will pay and the Contractor agrees to accept, subject to the terms and conditions hereof, the lump sum prices or unit prices in the Contractor's Proposal and the award made therein, plus the amount required to be paid for any extra work ordered under Article 7.02 hereof, less credit for any work omitted pursuant to Article 7.04 hereof. Under unit price items, the number of units actually required to complete the work under the Contract may be more than stated in the Proposal. The Contractor agrees that no claim will be made for any damages or for loss of profits because of a difference between the quantities of the various classes of work assumed and stated in the Proposal Form as a basis for comparing Proposals and the quantities of work actually performed.

The sum as awarded for any lump sum Contract or lump sum Contract Item shall represent payment in full for all of the various classes of work, including materials, equipment, and labor necessary or required to complete, in conformity with the Contract Document, the entire work shown, indicated or specified under the lump sum Contract or lump sum Contract Item.

The amount as awarded as a unit price for any unit price Contract Item shall represent payment in full for all the materials, equipment, and labor necessary to complete, in conformity with the Contract Documents, each unit of work shown, specified, or required under the said unit price Contract Item.

No payment other than the amount as awarded will be made for any class of work included in a lump sum Contract Item or a unit price Contract Item, unless specific provision is

made therefor in the Contract Documents.

#### **ARTICLE 10.02 SUBMISSION OF BID BREAKDOWN**

Within fifteen (15) days after the execution of this Contract, the Contractor must submit to the Engineer in duplicate an acceptable breakdown of the lump sums and unit prices bid for items of the Contract, showing the various operations to be performed under the Contract, as described in the progress schedule required under Article 4.02 hereof, and the value of each of such operations, the total of such items to equal the total price bid. The Contractor shall also submit such other information relating to the bid prices as may be required and shall revise the bid breakdown as directed. Thereafter, the breakdown may be used for checking the Contractor's applications for partial payments hereunder but shall not be binding upon the City or the Engineer for any purpose whatsoever.

#### **ARTICLE 10.03 REPORTS, RECORDS AND DATA**

The Contractor shall furnish to the Engineer such schedules of quantities and costs, progress schedules, reports, invoices, delivery tickets, estimates, records, and other data as the Engineer may request concerning work performed or to be performed and the materials furnished under the Contract.

#### **ARTICLE 10.04 PAYMENTS BY CONTRACTOR**

The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered, (b) for all materials, tools, and equipment delivered at the site of the project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors, to the extent of each subcontractor's interest therein; and proof of such payments or releases therefor shall be submitted to the Engineer upon request.

#### **ARTICLE 10.05 PARTIAL PAYMENTS**

On or about the first of each month, the Contractor shall make and certify an estimate, on forms prescribed by the City, of the amount and fair value of the work done, and may apply for partial payment therefor. The Contractor shall revise the estimate as the Engineer may direct. When satisfactory progress has been made, and shows that the value of the work completed since the last payment exceeds one percent (1%) of the total Contract price in amount, the Engineer will issue a certificate that such work has been completed and the value thereof. The City will then issue a voucher to the Contractor in accordance with the following schedule:

#### **FOR CONTRACT AMOUNTS UNDER \$250,000**

(A) In the amount of ninety percent (90%) of the value of the work completed as certified until construction is one hundred percent (100%) complete (operational or beneficial occupancy), the withheld amount may be reduced below ten percent (10%), at the Engineer's option, to only that amount necessary to assure completion.

**FOR CONTRACT AMOUNTS OVER \$250,000**

(A) In the amount of ninety percent (90%) of the value of the work completed as certified until construction is fifty percent (50%) complete.

(B) When the dollar value, as determined by the Engineer, of satisfactorily completed work in place is greater than fifty percent (50%) of the original contract price, vouchers for partial payment will be issued by the City to the Contractor in the amount of one hundred percent (100%) of the value of the work, above 50%, completed as certified for that payment period.

(C) If the Contractor has performed satisfactorily and the work is substantially complete (operational or beneficial occupancy) the withheld amount may be reduced, at the Engineer's option, to only that amount necessary to assure completion.

In addition to the Conditions set forth in (A), (B), and (C) above, payments will always be less any sums that may be retained or deducted by the City under the terms of any of the contract documents and less any sums that may be retained to cover monetary guarantees for equipment, materials or progress performance.

Payment on estimates made on or about the first of the month may be expected on or about the 20th of the month.

Unless specified otherwise in the Contract Items, the delivered cost of equipment and nonperishable materials suitably stored at the site of the work and tested for adequacy may be included in the Contractor's application for partial payment provided, however, that the Contractor shall furnish evidence satisfactory to the City that the Contractor is the unconditional owner and in possession of such materials or equipment. The amount to be paid will be 90 percent of the invoice cost to the Contractor which cost shall be supported by receipted bills within 30 days of the date of payment by the City to the Contractor. Such payment shall not relieve the Contractor from full responsibility for completion of the work and for protection of such materials and equipment until incorporated in the work in a permanent manner as required by the Contract Documents.

Before any payment will be made under this Contract, the Contractor and every subcontractor, if required, shall deliver to the Engineer a written, verified statement, in satisfactory form, showing in detail all amounts then due and unpaid by such Contractor or subcontractor to all laborers, workmen, and mechanics, employed by him under the Contract for the performance of the work at the site thereof, for daily or weekly wages, or to other persons for materials, equipment, or supplies delivered at the site of the work during the period covered by the payment under consideration.

**ARTICLE 10.06 FINAL PAYMENT**

Under determination of satisfactory completion of the work under this Contract as provided in Article 4.07 hereof, the Engineer will prepare the final estimate showing the value of the completed work. This estimate will be prepared within 30 days after the date of completion or as soon thereafter as the necessary measurements and computations can be made.

All prior certificates and estimates, being approximate only, are subject to correction in the final estimate and payment.

When the final estimate has been prepared and certified by Engineer, he will submit to the Mayor and City Council the final certificate stating that the work has been completed and the amount based on the final estimate remaining due to the Contractor. The City will then accept the work as fully completed and will, not later than 30 days after the final acceptance, as defined in Article 1.02, of the work done under this Contract, pay the Contractor the entire amount so found due thereunder after deduction of all previous payments and all percentages and amounts to be kept and retained under provisions of this Contract; provided, however, and it is understood and agreed that, as a precedent to receiving final payment, the Contractor shall submit to the City a sworn affidavit that all bills for labor, service, materials, and subcontractors have been paid and that there are no suits pending in connection with this work. The City, at its option, may permit the Contractor to execute a separate surety bond in a form satisfactory to the City. The surety bond shall be in the full amount of the suit or suits.

Neither the final payment nor any part of the retained percentage shall be paid until the Contractor, if required, shall furnish the City with a complete release from any should remain unsatisfied after all payments are made, the Contractor shall refund to the City all monies which the City may be compelled to pay in discharging such claim, including incidental costs and attorney's fees.

**ARTICLE 10.07 ACCEPTANCE OF FINAL PAYMENT**

The acceptance by the Contractor, or by anyone claiming by or through him, of the final payment shall operate as and shall be a release to the City and every officer and agent thereof from any and all claims and liability to the Contractor for anything done or furnished in connection with the work or project and for any act or neglect of the Contractor or of any others relating to or affecting the work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance Bond.

**SECTION 11 MISCELLANEOUS PROVISIONS**

**ARTICLE 11.01 CONTRACTOR'S WARRANTIES**

In consideration of, and to induce the award of this contract to him, the Contractor represents and warrants:

- (a) That he is not in arrears to the City upon debt or contract, and he is not a defaulter, as surety, contractor, or otherwise.
- (b) That he is financially solvent and sufficiently experienced and competent to perform the work.
- (c) That the work can be performed as called for by the Contract Documents.
- (d) That the facts stated in his proposal and the information given by him are true and correct in all respects.
- (e) That he is fully informed regarding all the conditions affecting the work to be done and labor and materials to be

furnished for the completion of this Contract, and that his information was secured by personal investigation and research.

**ARTICLE 11.02 PATENTED DEVICES, MATERIAL AND PROCESSES**

It is mutually understood and agreed that Contract prices include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work. Whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify and save harmless the City, its officers, agents and employees from any and all claims for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract, and shall indemnify the said City, its officers, agents, and employees for any costs, expenses, and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

**ARTICLE 11.03 SUITS AT LAW**

In case any action at law or suit in equity may or shall be brought against the City or any of its officers, agents, or employees for or on account of the failure, omission, or neglect of the Contractor or his subcontractors, employees, or agents, to do or perform any of the covenants, acts, matters, or things by this Contract undertaken to be done or performed by the Contractor or his subcontractors, employees, or agents, or from any injuries done to property or persons and caused by the negligence or alleged negligence of the Contractor or his subcontractors, employees, or agents, or in any other manner arising out of the performance of this Contract, then the Contractor shall immediately assume and take charge of the defense of such actions or suits in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor, and the Contractor shall also indemnify and save harmless the City, its officers, agents, and employees from any and all loss, cost or damage whatever arising out of such actions or suits, in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor.

The Contractor shall and does hereby assume all liability for and agrees to indemnify the City or its Engineer against any or all loss, costs, damages, and liability for any or by reason of any lien, claims or demands, either for materials purchased or for work performed by laborers, mechanics, and others and from any damages, costs, actions, or causes of action and judgement arising from injuries sustained by mechanics, laborers, or other persons by reason of accidents or otherwise, whether caused by the carelessness or inefficiency or neglect of said Contractor, his subcontractors, agents, employees, workmen or otherwise.

**ARTICLE 11.04 CLAIMS FOR DAMAGES**

If the Contractor shall claim compensation for any damage sustained, other than for extra or disputed work covered by Article 7.02 and 7.03 hereof, by reason of any act or omission of the City, its agents, or any persons, he shall, within five days after sustaining such damage, make and

deliver to the Engineer a written statement of the nature of the damage sustained and of the basis of the claim against the City. On or before the 15th of the month succeeding that in which any damage shall have been sustained, the Contractor shall make and deliver to the Engineer an itemized statement of the details and amounts of such damage, duly verified by the Contractor. Unless such statements shall be made delivered within the times aforesaid, it is stipulated that and all claims for such compensation shall be forfeited and invalidated, and the Contractor shall not be entitled to payment on account of such claims.

**ARTICLE 11.05 NO CLAIMS AGAINST INDIVIDUALS**

No claim whatsoever shall be made by the Contractor against any officer, agent, employee of the City for, or on account of, anything done or omitted to be done in connection with this Contract.

**ARTICLE 11.06 LIABILITY UNAFFECTED**

Nothing herein contained shall in any manner create any liability against the City on behalf of any claim for labor, services, or materials, or of subcontractors, and nothing herein contained shall affect the liability of the Contractor or his sureties to the City or to any workmen or materialsmen upon bond given in connection with this Contract.

**ARTICLE 11.07 INDEMNIFICATION PROVISIONS**

Whenever there appears in this Agreement, or in the other Contract Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

**ARTICLE 11.08 UNLAWFUL PROVISIONS DEEMED STRICKEN**

If this contract contains any unlawful provisions not an essential part of the Contract and which shall not appear to have a controlling or material inducement to the making thereof, such provisions shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Contract without affecting the binding force of the remainder.

**ARTICLE 11.09 LEGAL PROVISIONS DEEMED INCLUDED**

Each and every provision of any law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein and if, through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon application of either party the Contract shall forthwith be physically amended to make such insertion.

**ARTICLE 11.10 DEATH OR INCOMPETENCY OF CONTRACTOR**

In the event of death or legal incompetency of a Contractor who shall be an individual or surviving member of a contracting firm, such death or adjudication of incompetency



shall not terminate the Contract, but shall act as default hereunder to the effect provided in Article 9.01 hereof and the estate of the Contractor and his surety shall remain liable hereunder to the same extent as though the Contractor had lived. Notice of default, as provided in Article 9.01 hereof, shall not be required to be given in the event of such death or adjudication of incompetency.

**ARTICLE 11.11 NUMBER AND GENDER OF WORDS**

Whenever the context so admits or requires, all references herein in one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

**ARTICLE 11.12 ACCESS TO RECORDS**

Representatives of Federal Agencies, if applicable, and the State of Florida shall have access to the work whenever it is in preparation of progress. On federally assisted projects the Federal Agency, the Comptroller General of the United States, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcription thereof.

**SECTION 12  
LABOR STANDARDS**

**ARTICLE 12.01 LABOR STANDARDS**

The Contractor shall comply with all of the regulations set forth in "Labor Standards Provisions for Federally Assisted Construction Contracts", which may be attached, and any applicable Florida Statutes.

**ARTICLE 12.02 NOTICE TO LABOR UNIONS**

If required, the Contractor shall provide Labor Unions and other organizations of workers, and shall post, in a conspicuous place available to employees or applicants for employment, a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers" attached to and made a part of this Agreement.

**ARTICLE 12.03 SAFETY AND HEALTH REGULATIONS**

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). Nothing in these Acts shall be construed to supersede or in any manner affect any worker's compensation law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, diseases, or death of employees arising out of, or in the course of, employment.

**ARTICLE 12.04 EEO AFFIRMATIVE ACTION REQUIREMENTS**

The Contractor understands and agrees to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under this Contract. The Contractor also agrees to similarly

bind contractually each subcontractor. In policies, the Contractor agrees to engage in Affirmative Action directed at promoting and ensuring equal employment opportunity in the work force used under the Contract (and the Contractor agrees to require contractually the same effort of all subcontractors whose subcontractors exceed \$100,000). The Contractor understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the Contract.

**ARTICLE 12.05 PREVAILING RATES OF WAGES**

Florida's prevailing wage law was repealed effective April 25, 1979.

For Federally assisted projects, appropriate prevailing wage rate determinations are indicated on pages beginning with WR-1.

\* \* \* \* \*

IN WITNESS THEREOF, the parties have hereunto set their hands and seals, and such of them as are corporation have caused these present to be signed by their duly authorized officers.

CITY OF TAMPA, FLORIDA

\_\_\_\_\_  
Jane Castor, Mayor  
(SEAL)

ATTEST:

\_\_\_\_\_  
City Clerk

Approved as to Form:  
The execution of this document was authorized  
by Resolution No. \_\_\_\_\_

\_\_\_\_\_  
Justin R. Vaske, Senior Assistant City Attorney

Contractor

By: \_\_\_\_\_  
(SEAL)

Title:

ATTEST:

\_\_\_\_\_  
Witness



**PUBLIC CONSTRUCTION BOND**

Bond No. (enter bond number) \_\_\_\_\_

Name of Contractor: \_\_\_\_\_

Principal Business Address of Contractor: \_\_\_\_\_

Telephone Number of Contractor: \_\_\_\_\_

Name of Surety (if more than one list each): \_\_\_\_\_

Principal Business Address of Surety: \_\_\_\_\_

Telephone Number of Surety: \_\_\_\_\_

Owner is The City of Tampa, Florida

Principal Business Address of Owner: \_\_\_\_\_ 306 E Jackson St, Tampa, FL 33602

\_\_\_\_\_ Contract Administration Department (280A4N)

Telephone Number of Owner: \_\_\_\_\_ 813/274-8456

Contract Number Assigned by City to contract which is the subject of this bond: \_\_\_\_\_

Legal Description or Address of Property Improved or Contract Number is: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

General Description of Work and Services: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS That we, \_\_\_\_\_

\_\_\_\_\_  
(Name of Contractor)

as Principal, hereinafter called CONTRACTOR, of the State of \_\_\_\_\_, and

\_\_\_\_\_  
(Name of Surety)

a corporation organized and existing under and by virtue of the laws of the State of \_\_\_\_\_, and regularly authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto the City of Tampa, a municipal corporation organized and existing under the laws of the State of Florida, hereinafter called Owner, in the penal sum of \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents (\$ \_\_\_\_\_), lawful money of the United States of America, for the payment whereof well and truly to be made, we bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated \_\_\_\_\_, \_\_\_\_\_, 20\_\_\_\_, between Principal and Owner for construction of \_\_\_\_\_, the contract being made a part of this bond by reference, in the time and in the manner prescribed in the contract; and
2. Promptly makes payments to all claimants, as defined in Section 255.05(1) (Section 713.01), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and
3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and
4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.
5. Contractor and Surety acknowledge that the Work for which this bond has been issued may be one of several such contract documents for a group of projects. This bond does not secure covenants to pay for or to perform design services survey or program management services. The Owner/Obligee is expected to reasonably account for damages that are caused to Owner with respect to Principal's (Contractor's) default in performance of the scope of the Work incorporated by reference into the bond, and notwithstanding any contractual or common law remedy permitted to Owner as against Contractor, the obligation of Surety for any damages under this bond shall be determined by the cost of completion of the Work less the contract balance unpaid upon default of Contractor for the Work plus liquidated damages at the rate of \$500.00 per day for delays by the Contractor and/or Surety in reaching substantial completion.
6. The notice requirements for claimants and conditions for entitlement to payment set forth in Section 255.05, Fla. Stat. and the limitations period to actions upon Section 255.05, Fla. Stat. bonds apply to claimants seeking payment from surety under this bond. Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05, Florida Statutes.
7. The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the contract documents or other Work to be performed hereunder, or the specifications referred to therein shall in any way affect its obligations under this bond, and it does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to Work or to the specifications.

8. The above SURETY states that it has read all of the Contract Documents made by the CONTRACTOR with the CITY, hereto attached, and the terms and conditions of the contract and work, and is familiar therewith and in particular those portions of the Agreement concerning the guaranty of such CONTRACTOR for a period of one year following the date of the final acceptance of the completed work under the Contract by the CITY, all of which this BOND includes.

DATED ON \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
(Name of Principal)

\_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Principal Business Address)

\_\_\_\_\_  
(Surety Address)

By \_\_\_\_\_

By \_\_\_\_\_  
(As Attorney in Fact)\*

Title \_\_\_\_\_

\_\_\_\_\_  
Telephone Number of Surety

\_\_\_\_\_  
Telephone Number of Principal

Approved as to legal sufficiency:

**Countersignature:**

By Justin R. Vaske E/S  
Justin R. Vaske, Senior Assistant City Attorney

\_\_\_\_\_  
(Name of Local Agency)

\_\_\_\_\_  
(Address of Resident Agent)

By \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Telephone Number of Local Agency

\*(As Attorney in Fact) attach Power of Attorney and Current Certificate with Original Signature

# SPECIFICATIONS GENERAL PROVISIONS

## SECTION 1 SCOPE AND INTENT

### G-1.01 DESCRIPTION

The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

### G-1.02 WORK INCLUDED

The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Provisions, for which there are no specific Contract Items, shall be considered as part of the overhead cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.

The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his plant and equipment, prior approval of the Engineer notwithstanding.

### G-1.03 PUBLIC UTILITY INSTALLATIONS AND STRUCTURES

Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the City, other governmental bodies or privately owned by individuals, firms, or corporations, and used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work.

The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself

fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the City or other governmental body which are shown on the Plans to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various Contract Items. No separate payment shall be made therefor.

Where public utility installations or structures owned or controlled by the City or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided for in Article 7.02 of the Agreement.

The Contractor shall, at all times in performance of the work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

All City and other governmental utility departments and other owners of public utilities, which may be affected by the work, will be informed in writing by the Engineer within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to, the responsibilities of the City and other governmental



utility departments and other owners of public utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Plans and Specifications covering the work under such Contract or Contracts.

In addition to the general notice given by the Engineer, the Contractor shall give written notice to all City and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Underground Utility Notification Center for Excavators (Call Candy)".

The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

## **SECTION 2 PLANS AND SPECIFICATIONS**

### **G-2.01 PLANS**

The Plans referred to in the Contract Documents bear the general project name and number as shown in the Notice To Bidders.

When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

### **G-2.02 COPIES FURNISHED TO CONTRACTOR**

After the Contract has been executed, the Contractor will be furnished with five sets of paper prints, the same size as the original drawings, of each sheet of the Plans and five copies of the Specifications. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for his work.

### **G-2.03 SUPPLEMENTARY DRAWINGS**

When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and five paper prints thereof will be given to the Contractor.

The Supplementary Drawings shall be binding upon the Contractor with the same force as the Plans. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

### **G-2.04 CONTRACTOR TO CHECK PLANS AND DATA**

The Contractor shall verify all dimensions, quantities, and details shown on the Plans, Supplementary Drawings, Schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions as full instructions will be furnished by the Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

### **G-2.05 SPECIFICATIONS**

The specifications consist of four parts, the General Provisions, the Technical Specifications, the Special Provisions and the Contract Items. The General Provisions and Technical Specifications contain general requirements which govern the work. The Special Provisions and the Contract Items modify and supplement these by detailed requirements for the work and shall always govern, whenever there appears to be conflict.

### **G-2.06 INTENT**

All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

## **SECTION 3 WORKING DRAWINGS**

### **G-3.01 SCOPE**

The Contractor shall promptly prepare and submit layout, detail and shop drawings to insure proper construction, assembly, and installation of the work using those materials and methods as hereafter specified under the Technical Specifications, Special Provisions and Contract Items.

These drawings shall accurately and distinctly present the following:

- a. All working and erection dimensions.
- b. Arrangements and sectional views.
- c. Necessary details, including complete information for making connections between work under this Contract and work under other Contracts.
- d. Kinds of materials and finishes.
- e. Parts listed and description thereof.

Drawings for mechanical equipment shall present, where applicable, such data as dimensions, weight and performance characteristics. These data shall show conformance with the performance characteristics and other criteria incorporated in the Plans and Specifications.

Each drawing shall be dated and shall contain the name of the project, Division number and description, the technical specifications section number, names of equipment or materials and the location at which the equipment or materials are to be installed. Location shall mean both physical location and location relative to other connected or attached material. The Engineer will return unchecked any submittal which does not contain complete data on the work and full information on related matters.

Stock or standard drawings will not be accepted for review unless full identification and supplementary information is shown thereon in ink or typewritten form.

The Contractor shall review all working drawing submittals before transmitting them to the Engineer to determine that they comply with requirements of the Specifications. Drawings which are incomplete or are not in compliance with the Contract Documents shall not be submitted for processing by the Engineer. The Contractor shall place his stamp of approval on all working drawings submitted to the Engineer to indicate compliance with the above.

#### **G-3.02 APPROVAL**

If the working drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal; otherwise approval of such submittals shall not constitute approval of the departure. Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment, or apparatus shown or indicated.

The approval of drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the proper fitting and construction of the work, nor for the furnishing of materials or work required by the Contract and not indicated on the drawings. No work called for by working drawings shall be done until such drawings have been approved by the Engineer.

The procedure in seeking approval of the working drawings shall be as follows:

1. The Contractor shall submit four complete sets of drawings

and other descriptive data together with one copy of a letter of transmittal to the Engineer for approval. The letter of transmittal shall contain the name of the project, contract number, technical specifications section number, the name of the Contractor, a list of drawings with numbers and titles, and any other pertinent information.

2. Drawings or descriptive data will be stamped "Approved", "Approved Subject to Corrections Marked", or "Examined and Returned for Correction" and one copy with a letter of transmittal will be returned to the Contractor.

3. If a drawing or other data is stamped "Approved", the Contractor shall insert the date of approval on five additional copies of the document and transmit the five copies to the Engineer together with one copy of a letter of transmittal containing substantially the same information as described in Instruction 1. above.

4. If a drawing or other data is stamped "Approved Subject to Corrections Marked", the Contractor shall make the corrections indicated and proceed as in Instruction 3., above.

5. If a drawing or data is stamped "Examined and Returned for Correction", the Contractor shall make the necessary corrections and resubmit the documents as set forth in Instruction 1., above. The letter of transmittal shall indicate that this is a resubmittal.

The Contractor shall revise and resubmit the working drawings as required by the Engineer, until approval thereof is obtained.

## **SECTION 4 MATERIALS AND EQUIPMENT**

### **G-4.01 GENERAL REQUIREMENTS**

All materials, appliances, and types or methods of construction shall be in accordance with the Specifications and shall, in no event, be less than that necessary to conform to the requirements of any applicable laws, ordinances, and codes.

All materials and equipment shall be new, unused, and correctly designed. They shall be of standard first grade quality, produced by expert personnel, and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

The quality of Workmanship and Materials entering into the work under this Contract shall conform to the requirements of the pertinent sections, clauses, paragraphs, and sentences, both directly and indirectly applicable thereto, of that part of the Technical Specifications, whether or not direct reference to such occurs in the Contract Items.

Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA and other

generally accepted standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operation. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, and the like, shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.

Equipment shall be of the approximate dimensions as indicated on the Plans or as specified, shall fit the spaces shown on the Plans with adequate clearances, and shall be capable of being handled through openings provided in the structure for this purpose. The equipment shall be of such design that piping and electrical connections, ductwork, and auxiliary equipment can be assembled and installed without causing major revisions to the location or arrangement of any of the facilities.

Machinery parts shall conform exactly to the dimensions shown on the working drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable. All grease lubricating fittings on equipment shall be of a uniform type. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANSI and applicable state and local codes.

#### **G-4.02 MANUFACTURER**

The names of proposed manufacturers, suppliers, material, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

#### **G-4.03 REFERENCE TO STANDARDS**

Whenever reference is made to the furnishing of materials or

testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for proposals, even though reference has been made to an earlier standard, and such standards are made a part hereof to the extent which is indicated or intended.

Reference to a technical society, organization or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO for American Association of State Highway and Transportation Officials (formerly AASHO)  
ACI for American Concrete Institute  
AGMA for American Gear Manufacturer's Association  
AFBMA for Anti-Friction Bearing Manufacturer's Association  
AISC for American Institute of Steel Construction  
AISI for American Iron and Steel Institute  
ANSI for American National Standards Institute  
ASCE for American Society of Civil Engineers  
ASTM for American Society for Testing and Materials  
ASME for American Society of Mechanical Engineers  
AWS for American Welding Society  
AWWA for American Water Works Association  
AWPA for American Wood Preservers Association  
CEMA for Conveyor Equipment Manufacturers Association  
CIPRA for Cast Iron Pipe Research Association  
IEEE for Institute of Electrical and Electronic Engineers  
IPCEA for Insulated Power Cable Engineers Association  
NEC for National Electrical Code  
NEMA for National Electrical Manufacturers Association  
SAE for Society of Automotive Engineers  
SHBI for Steel Heating Boiler Institute  
Fed.Spec. for Federal Specifications  
Navy Spec. for Navy Department Specifications  
U.L.,Inc. for Underwriters' Laboratories, Inc.

When no reference is made to a code, standard or specification, the Standard Specifications of the ANSI, the ASME, the ASTM, the IEEE, or the NEMA shall govern.

#### **G-4.04 SAMPLES**

The Contractor shall, when required, submit to the Engineer for approval typical samples of materials and equipment. The samples shall be properly identified by tags and shall be submitted sufficiently in advance of the time when they are to be incorporated into the work, so that rejections thereof will not cause delay. A letter of transmittal, in duplicate, from the Contractor requesting approval must accompany all such samples.

#### **G-4.05 EQUIVALENT QUALITY**

Whenever, in the Contract Documents, an article, material, apparatus, equipment, or process is called for by trade name or by the name of a patentee, manufacturer, or dealer or by reference to catalogs of a manufacturer or dealer, it shall be understood as intending to mean and specify the article, material, apparatus, equipment or process designated, or any

equal thereto in quality, finish, design, efficiency, and durability and equally serviceable for the purposes for which it is intended.

Whenever material or equipment is submitted for approval as being equal to that specified, the decision as to whether or not such material or equipment is equal to that specified shall be made by the Engineer.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the Contractor shall immediately proceed to furnish the designated material or equipment.

Neither the approval by the Engineer of alternate material or equipment as being equivalent to that specified nor the furnishing of the material or equipment specified, shall in any way relieve the Contractor of responsibility for failure of the material or equipment, due to faulty design, material, or workmanship, to perform the functions required of them by the Specifications.

#### **G-4.06 DELIVERY**

The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid a delay in, or impediment of, the progress of the work of any related Contractor.

#### **G-4.07 CARE AND PROTECTION**

The Contractor shall be solely responsible for properly storing and protecting all materials, equipment, and work furnished under the Contract from the time such materials and equipment are delivered at the site of the work until final acceptance thereof. He shall, at all times, take necessary precautions to prevent injury or damage by water, freezing, or by inclemencies of the weather to such materials, equipment and work. All injury or damage to materials, equipment, or work resulting from any cause whatsoever shall be made good by the Contractor.

The Engineer shall, in all cases, determine the portion of the site to be used by the Contractor for storage, plant or for other purposes. If, however, it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the work or interference with the work to be done by any other Contractor, the Contractor shall remove and restack such materials at his own expense.

#### **G-4.08 TOOLS AND ACCESSORIES**

The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

Spare parts shall be furnished as specified.

Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

#### **G-4.09 INSTALLATION OF EQUIPMENT**

The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall, at his own expense, furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations. Grout shall completely fill the space between the equipment base and the foundation.

#### **G-4.10 OPERATING INSTRUCTIONS**

The Contractor, through qualified individuals, shall adequately instruct designated employees of the City in the operation and care of all equipment installed hereunder, except for equipment that may be furnished by the City.

The Contractor shall also furnish and deliver to the Engineer three complete sets for permanent files, identified in accordance with Subsection G-3.01 hereof, of instructions, technical bulletins and any other printed matter, such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair, of the equipment installed and the ordering of spare parts, except for equipment that may be furnished by the City.

In addition to the above three copies, the Contractor shall furnish any additional copies that may be required for use during construction and start-up operations.

#### **G-4.11 SERVICE OF MANUFACTURER'S ENGINEER**

The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in

permanent operation by the City, such engineer or superintendent shall make all adjustments and tests required by the Engineer to provide that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the City in the proper operation and maintenance of such equipment.

## **SECTION 5 INSPECTION AND TESTING**

### **G-5.01 GENERAL**

The Contractor's attention is hereby directed to Article 3.03 of the Agreement.

Inspection and testing of materials will be performed by the City unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material and equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the City.

Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the City formally takes over the operation thereof.

### **G-5.02 COSTS**

All inspection and testing of materials furnished under this Contract will be performed by the City or duly authorized inspection engineers or inspection bureaus without cost to the Contractor, unless otherwise expressly specified.

The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the contract price.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the City for compliance. The Contractor shall reimburse the City for the expenditures incurred in making

such tests on materials and equipment which are rejected for noncompliance.

### **G-5.03 INSPECTIONS OF MATERIALS**

The Contractor shall give notice, in writing to the Engineer, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

### **G-5.04 CERTIFICATE OF MANUFACTURE**

When inspection is waived or when the Engineer so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

### **G-5.05 SHOP TESTS OF OPERATING EQUIPMENT**

Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.

Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.

The cost of the shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

### **G-5.06 PRELIMINARY FIELD TESTS**

As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments, and replacements required.

## TEMPORARY STRUCTURES

### G-5.07 FINAL FIELD TESTS

Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment, and instruments necessary for all acceptance tests, at no additional cost to the City.

### G-5.08 FAILURE OF TESTS

Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make those corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees or specified requirements, the City, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the City rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the City may, after the expiration of a period of thirty calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under this Contract.

The City agrees to obtain other equipment within a reasonable time and the Contractor agrees that the City may use the equipment furnished by him without rental or other charges until the new equipment is obtained.

Materials or work in place that fails to pass acceptability tests shall be retested at the direction of the construction engineer all such retests shall be at the Contractor's expense. The rates charged shall be in accordance with the Department of Public Works current annual inspection contract which is available for inspection at the offices of the Department of Public Works.

### G-5.09 FINAL INSPECTION

The procedures for final inspection shall be in accordance with the provisions of Article 4.07 of the Agreement. During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all the requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

## SECTION 6

### G-6.01 GENERAL

All false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the work and which are not herein described or specified in detail, must be furnished, maintained and removed by the Contractor, and he shall be responsible for the safety and efficiency of such works and for any damages that may result from their failure or from their improper construction, maintenance, or operation.

### G-6.02 PUBLIC ACCESS

At all points in the work where public access to any building, house, place of business, public road, or sidewalk would be obstructed by any action of the Contractor in executing the work required by this Contract, the Contractor shall provide such temporary structure, bridges or roadway as may be necessary to maintain public access at all times. At least one lane for vehicular traffic shall be maintained in streets in which the Contractor is working. Street closure permits are required from the Department of Public Works.

The Contractor shall provide suitable temporary bridges, as directed by the Engineer, at street intersections when necessary for the maintenance of vehicular and pedestrian traffic.

Prior to temporarily cutting of access to driveways and garages, the Contractor shall give twelve (12) hours notice to affected property owners. Interruptions to use of private driveways shall be kept to a minimum.

### G-6.03 CONTRACTOR'S FIELD OFFICE

The Contractor shall erect, furnish and maintain a field office with a telephone at the site during the entire period of construction. He or an authorized agent shall be present at this office at all times while his work is in progress. Readily accessible copies of both the Contract Documents and the latest approved working drawings shall be kept at this field office.

### G-6.04 TEMPORARY FENCE

If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

### G-6.05 RESPONSIBILITY FOR TEMPORARY STRUCTURES

In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance, or operation and will indemnify and save harmless the City from



all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

## **SECTION 7 TEMPORARY SERVICES**

### **G-7.01 WATER**

The Contractor shall provide the necessary water supply at his own expense. He shall, if necessary, provide and lay necessary waterlines from existing mains to the place of using, shall secure all necessary permits and pay for all taps to water mains or hydrants and for all water used at the established rates.

### **G-7.02 LIGHT AND POWER**

The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution and inspection of the work. If, in the opinion of the Engineer, these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected thereby.

### **G-7.03 SANITARY REGULATIONS**

The Contractor shall prohibit and prevent the committing of nuisances on the site of the work or on adjoining property and shall discharge any employee who violates this rule.

Ample washrooms and toilet facilities and a drinking water supply shall be furnished and maintained in strict conformity with the law by the Contractor for use by his employees.

### **G-7.04 ACCIDENT PREVENTION**

Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws, building and construction codes shall be observed. The Contractor shall comply with the U. S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the Contract Work. Hours and Safety Standards Act (PL 91-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act.

### **G-7.05 FIRST AID**

The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when men are employed on the work.

### **G-7.06 HEATING**

The Contractor shall provide temporary heat, at his own expense, whenever required on account of work being carried on during cold weather and to prevent freezing of water pipes and other damage to the work.

## **SECTION 8**

## **LINES AND GRADES**

### **G-8.01 GENERAL**

All work done under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

The Engineer will establish bench marks and base line controlling points. Reference remarks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

### **G-8.02 SURVEYS**

The Contractor shall furnish and maintain, at his own expense, stakes and other such materials, and give such assistance, including qualified helpers, as may be required by the Engineer for setting reference marks. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review of the Engineer.

The Contractor shall keep the Engineer informed a reasonable time in advance as to his need for line and grade reference marks, in order that they may be furnished and all necessary measurements made for record and payment with the minimum of inconvenience to the Engineer or of delay to the Contractor.

It is the intention not to delay the work for the establishment of reference marks but, when necessary, working operations shall be suspended for such reasonable time as the Engineer may require for this purpose.

### **G-8.03 SAFEGUARDING MARKS**

The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

### **G-8.04 DATUM PLANE**

All elevations indicated or specified refer to the Mean Sea Level Datum of the U.S.C. & G.S. (N.O.S.) which is 0.80 feet above the Mean Low Water Datum of the U. S. Army

Corps of Engineers.

## **SECTION 9 ADJACENT STRUCTURES AND LANDSCAPING**

### **G-9.01 RESPONSIBILITY**

The responsibility for removal, replacement, relocation, repair, rebuilding or protection of all public utility installations, including poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, sewers, traffic control and fire alarm signal circuit installations and other appurtenances and facilities shall be in accordance with G-1.02 and G-1.03.

The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Plans, and the removal, relocation, and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payment will be made therefor. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, removal or relocation and reconstruction is necessary to avoid interference with the work, payment therefor will be made as provided for extra work in Article 7.02 of the Agreement.

### **G-9.02 PROTECTION OF TREES**

All trees and shrubs shall be adequately protected by the Contractor with boxes or otherwise and, within the City of Tampa, in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season, and at the sole expense of the Contractor.

Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.

The City may order the Contractor, for the convenience of the City, to remove trees along the line of trench excavation. If so ordered, the City will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

### **G-9.03 LAWN AREAS**

Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed and later replaced, or the area where sod has been removed shall be restored with new sod in the

manner described in the Technical Specifications section.

### **G-9.04 RESTORATION OF FENCES**

Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or Items, or if no specific Item is provided therefor, as part of the overhead cost of the work, and no additional payment will be made therefor.

## **SECTION 10 PROTECTION OF WORK AND PUBLIC**

### **G-10.01 TRAFFIC REGULATIONS**

The Contractor shall arrange his work to comply with Article G-6.02. The work shall be done with the least possible inconvenience to the public and to that end the work may be confined by the Engineer to one block at a time.

### **G-10.02 BARRIERS AND LIGHTS**

During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers, and lights, as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public. Such barriers and signs shall be constructed to State of Florida Department of Transportation standards and placed as recommended by the Traffic Division of the City's Department of Public Works.

No open fires will be permitted.

### **G-10.03 SMOKE PREVENTIONS**

The Contractor shall use hard coal, coke, oil or gas as fuel for equipment generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required.

### **G-10.04 NOISE**

The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

Except in the event of an emergency, no work shall be done between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays. If the proper and efficient prosecution of the work requires operations during the night, the written permission of the Engineer shall be obtained before starting such items of the work.

**SECTION 13  
CLEANING**

**G-10.05 ACCESS TO PUBLIC SERVICES**

Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

**G-10.06 DUST PREVENTION**

The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the streets sprinkled with water at all times.

**G-10.07 PRIVATE PROPERTY**

The Contractor shall so conduct the work that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the work unless he shall have obtained the owner's written consent thereto and shall have shown this consent to the Engineer.

**SECTION 11  
SLEEVES AND INSERTS**

**G-11.01 COORDINATION**

When the Contract requires the placing of conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors, and other like work in floors, roofs, or walls of buildings and structures, they shall be promptly installed in conformity with the construction program. The Contractor who erects the floors, roofs, and walls shall facilitate such work by fully cooperating with the Contractors responsible for installing such appurtenances. The Contractor responsible for installing such appurtenances shall arrange the work in strict conformity with the construction schedule and avoid interference with the work of other contractors.

**G-11.02 OPENINGS TO BE PROVIDED**

In the event timely delivery of sleeves and other materials cannot be made and to avoid delay, the affected Contractor may arrange to have boxes or other forms set at the locations where the appurtenances are to pass through or into the floors, roofs, walls, or other work. Upon the subsequent installation of these appurtenances, the Contractor erecting the structure shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors required to furnish the sleeves and inserts. Formed openings and later installation of sleeves will not be permitted at locations subject to hydrostatic pressure.

**SECTION 12  
CUTTING AND PATCHING**

**G-12.01 GENERAL**

The Contractor shall do all cutting, fitting, or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Plans and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

**G-13.01 DURING CONSTRUCTION**

During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefor develops.

**G-13.02 FINAL CLEANING**

At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished, and new appearing condition.

**SECTION 14  
MISCELLANEOUS**

**G-14.01 PROTECTION AGAINST SILTATION AND BANK EROSION**

The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed watercourses and drainage ditches.

**G-14.02 EXISTING FACILITIES**

The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Work shall be scheduled to minimize bypassing during construction. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

**G-14.03 USE OF CHEMICALS**

All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

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**Page 1 of 2 –DMI Payment**  
**City of Tampa – DMI Sub-(Contractors/Consultants/Suppliers) Payments**  
**(FORM MBD-30)**

[ ] Partial [ ] Final

Contract No.: \_\_\_\_\_ WO#,(if any): \_\_\_\_\_ Contract Name: \_\_\_\_\_

Contractor Name: \_\_\_\_\_ Address: \_\_\_\_\_

Federal ID: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

GC Pay Period: \_\_\_\_\_ Payment Request/Invoice Number: \_\_\_\_\_ City Department: \_\_\_\_\_

Total Amount Requested for pay period: \$ \_\_\_\_\_ Total Contract Amount(including change orders):\$ \_\_\_\_\_

Type of Ownership - (F=Female M=Male), BF BM = African Am., HF HM = Hispanic Am., AF AM = Asian Am., NF NM = Native Am., CF CM = Caucasian S = SLBE

Type	Trade/Work Activity	Federal ID	Total Sub Contract Or PO Amount	Amount Paid To Date	Amount To Be Paid For This Period
[ ]Sub [ ]Supplier				Amount Pending Previously Reported	Sub Pay Period Ending Date
				\$	\$
				\$	\$
				\$	\$
				\$	\$
				\$	\$
				\$	\$

**(Modifying This Form or Failure to Complete and Sign May Result in Non-Compliance)**

Certification: I hereby certify that the above information is a true and accurate account of payments to sub – contractors/consultants on this contract.

Signed: \_\_\_\_\_ Name/Title: \_\_\_\_\_ Date: \_\_\_\_\_



## Page 2 of 2 – DMI Payment

### Instructions for completing The DMI Sub-(Contractors/Consultants/ Suppliers) Payment Form (Form MBD-30)

This form must be submitted with all invoicing or payment requests where there has been subcontracting rendered for the pay period. If applicable, after payment has been made to the subcontractor, “Waiver and Release of Lien upon Progress Payment”, “Affidavit of Contractor in Connection with Final Payment”, or an affidavit of payment must be submitted with the amount paid for the pay period. The following will detail what data is required for this form. The instructions that follow correspond to the headings on the form required to be completed. **(Modifying or omitted information from this form my result in non-compliance).**

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **W.O.#** If the report covers a work order number (W.O.#) for the contract, please indicate it in that space.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.** A number assigned to a business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **Pay Period.** Provide start and finish dates for pay period. (e.g. 05/01/13 – 05/31/13)
- **Payment Request/Invoice Number.** Provide sequence number for payment requests. (ex. Payment one, write 1 in space, payment three, write 3 in space provided.)
- **City Department.** The City of Tampa department to which the contract pertains.
- **Total Amount Requested for pay period.** Provide all dollars you are expecting to receive for the pay period.
- **Total Contract Amount (including change orders).** Provide expected total contract amount. This includes any change orders that may increase or decrease the original contract amount.
- **Signed/Name/Title/Date.** This is your certification that the information provided on the form is accurate.
- **See attached documents.** Check if you have provided any additional documentation relating to the payment data. Located at the bottom middle of the form.
- **Partial Payment.** Check if the payment period is a partial payment, not a final payment. Located at the top right of the form.
- **Final Payment.** Check if this period is the final payment period. Located at the top right of the form.

The following instructions are for information of any and all subcontractors used for the pay period.

- **(Type) of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business or SLBE.
- **Trade/Work Activity.** Indicate the trade, service, or material provided by the subcontractor.
- **SubContractor/SubConsultant/Supplier.** Please indicate status of firm on this contract.
- **Federal ID.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax.** Provide company information for verification of payments.
- **Total Subcontract Amount.** Provide total amount of subcontract for subcontractor including change orders.
- **Amount Paid To Date.** Indicate all dollars paid to date for the subcontractor.
- **Amount Pending, Previously Reported.** Indicate any amount previously reported that payments are pending.
- **Amount To Be Paid for this Period.** Provide dollar amount of dollars requested for the pay period.
- **Sub Pay Period Ending Date.** Provide date for which subcontractor invoiced performed work.

*Forms must be signed and dated or will be considered incomplete. The company authorized representative must sign and certify the information is true and accurate. Failure to sign this document or return the document unsigned can be cause for determining a company is in non-compliance of Ordinance 2008-89.*

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

0 1 2 3 4 5 6 7 8

**Sign Information**

**Building a Better Tampa**

**David L. Tippin Water Treatment Facility  
Caustic Soda Piping Improvements**

*Project provides for Improvements at the David L. Tippin Water Treatment Facility to Improve the reliability and safety of the Sodium Hydroxide System of the water distribution system within the facility.*

\$TBD investment  
Scheduled for completion in TBD 2014

TBD

**Colors**

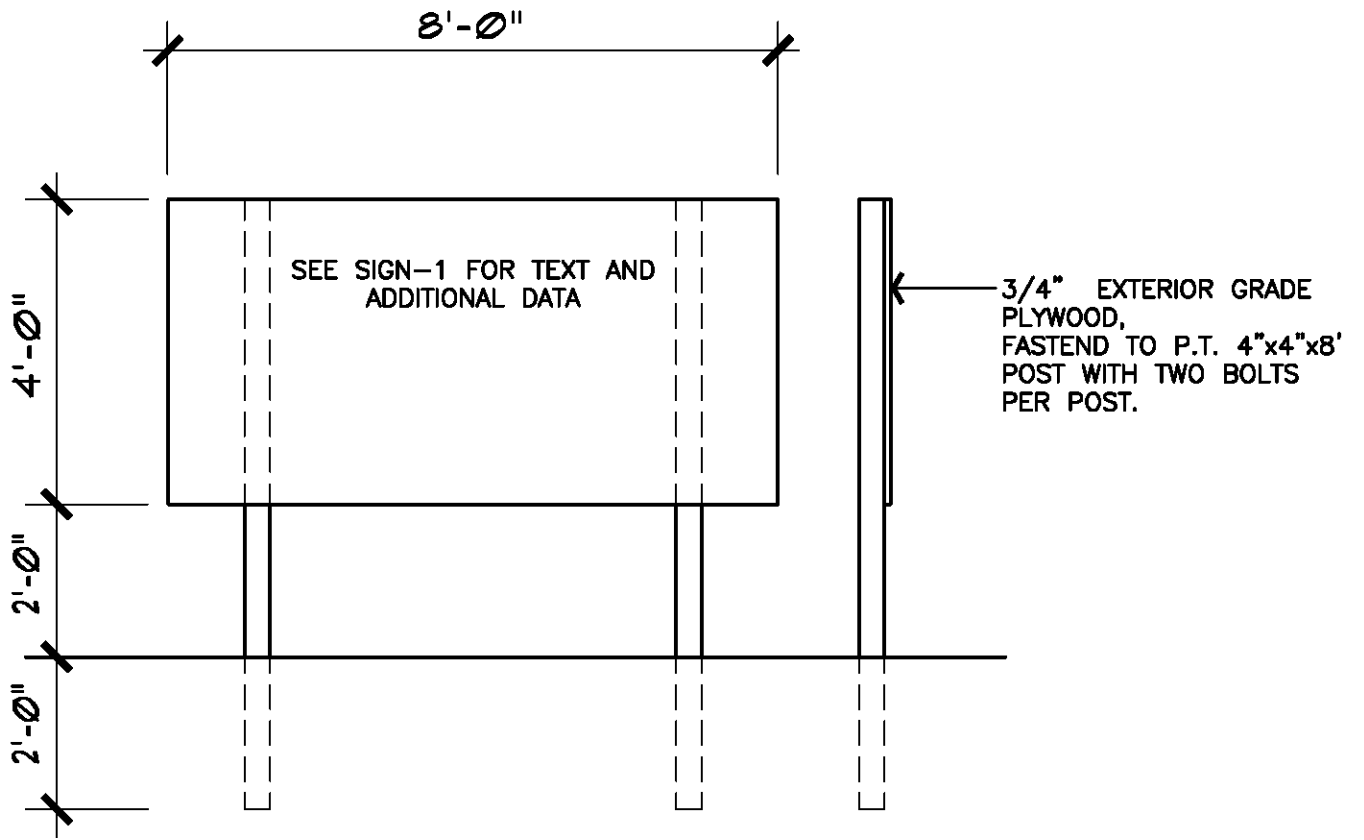
Blue: Sherwin Williams Naval SW6244  
Green: Sherwin Williams Center Stage SW 6920  
White: Sherwin Williams Pure White SW7005

**Font**

Franklin Gothic

**SIGN EXAMPLE ONLY GRAPHIC TO BE DEVELOPED BY CONTRACTOR**

not to scale





## SECTION 01010 - SUMMARY OF WORK

### 1.0 GENERAL:

The work shall consist of furnishing all materials, labor, equipment, tools, and all items and services required for the complete construction in conformity with Contract Documents of:

Kid Mason Community Center Renovation  
at  
1101 N Jefferson St, Tampa, FL 33602  
for the  
City of Tampa

All construction work and materials, in addition to complying with requirements of Contract Documents, shall fully comply with all requirements of local building codes, all ordinances, and regulations of other Federal, State and public authorities having jurisdiction over this type of work in the given area.

### 2.0 SCOPE:

The work shall include but not be limited to, addition of a new community center with masonry exterior walls, metal roof on wood trusses, standard commercial finishes, minor sitework with all associated work required for a complete project, as shown and indicated on the Drawings and in the Specifications.

### 3.0 LEGAL DESCRIPTION OF PROJECT SITE:

Legal description as shown on the drawings, Sheet C 1.0

### 4.0 VERIFICATION OF OWNER'S SURVEY DATA:

Prior to commencing any work, the Contractor shall satisfy himself as to accuracy of all survey data which shall affect his work as indicated in these plans and specifications and/or provided by the City.

Should the Contractor discover any inaccuracies or errors which will affect his work, he shall notify the Engineer and/or Architect in order that proper adjustments can be ordered.

The exact location of the building and related items shall be determined on site jointly by the Contractor and the Engineer and/or Architect. NO work shall commence until said final approval of the locations is made by the Engineer and/or Architect.

### 5.0 CONTRACT DOCUMENTS:

- a. BIDDING REQUIREMENTS
- b. GENERAL PROVISIONS, SUPPLEMENTARY GENERAL PROVISIONS, AND SPECIAL CONDITIONS

### 6.0 SPECIFICATIONS: (DATED: October 2022)

Divisions: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 31, 32, 33

7.0 DRAWINGS: (DATED: June 2018)

Sheets:

C-1.0 CoVER, D-1.0, D=2,.0 D-3.0, F-1.0, F-2,.0 A-1.0, A-1.1, A-1.2, A-2.0, A.0, A-3.1, A-3.2, A-3.3, A-4.0, A-4.1, A-4.2, A-5.0, A-6.0, A-7.0, A-8.0, E-1.0, E-1.1, E-1.2, E-1.3, T-1.0 , M-1.0, M-1.1, M-1.2, P-1.0, P-1., P-1.2, P-1.3, G001 Cover Shee, G002 , LX101, LX102, LD10, LD102, LG101, LG102, LG103, LG104, LG5, LG502, LG503, LS101, LS102, LS103, LS104, LS105, LS401, LS501, LS502, LS503, LS504, LS505, LS506, LS507, LS508, LS509, LP001, LP101

8.0 ADDENDA AND LETTERS OF CLARIFICATION:

All addenda and letters of clarification issued prior to bid opening time date.

SECTION 01020 - ALLOWANCES

PART 1 – GENERAL  
RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes administrative and procedural requirements governing allowances.

Types of allowances include the following:

Contingency allowances.

SELECTION AND PURCHASE

SUBMITTALS

Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

CONTINGENCY ALLOWANCES

Use the contingency allowance only as directed by the Owner.

The Contractor's related costs for services, products and equipment ordered by the Owner under the contingency allowance include delivery, installation, taxes, insurance, equipment rental, and similar costs.

Work Directive Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

EXAMINATION

Examine products covered by an allowance promptly upon delivery for damage or defects.

PREPARATION

Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

SCHEDULE OF ALLOWANCES

Allowance No. 1: Include a contingency allowance of \$50,000 for use according to the Owner's instructions. The allowance shall be included in the Base Bid.

END OF SECTION 01020

ALLOWANCES

01020 - 1

## SECTION 01040 - PROJECT COORDINATION

### PART 1 - GENERAL

#### RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

#### SUMMARY

This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

- Coordination.
- Administrative and supervisory personnel.
- General installation provisions.
- Cleaning and protection.

#### COORDINATION

Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

Make adequate provisions to accommodate items scheduled for later installation.

Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

- Preparation of schedules.
- Installation and removal of temporary facilities.
- Delivery and processing of submittals.
- Progress meetings.
- Project Close-out activities.

Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

## SUBMITTALS

Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

Show the interrelationship of components shown on separate Shop Drawings.

Indicate required installation sequences.

Refer to Division-15 Section "Basic Mechanical Requirements," and Division-16 Section "Basic Electrical Requirements" for specific coordination Drawing requirements for mechanical and electrical installations.

Staff Names: At the Preconstruction Conference, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

### GENERAL INSTALLATION PROVISIONS

Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

Recheck measurements and dimensions, before starting each installation.

Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

### CLEANING AND PROTECTION

During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

- Excessive static or dynamic loading.
- Excessive internal or external pressures.
- Excessively high or low temperatures.
- Thermal shock.
- Excessively high or low humidity.
- Air contamination or pollution.
- Water or ice.
- Solvents.
- Chemicals.
- Light.
- Radiation.
- Puncture.
- Abrasion.
- Heavy traffic.
- Soiling, staining and corrosion.
- Bacteria.
- Rodent and insect infestation.
- Combustion.
- Electrical current.
- High speed operation,
- Improper lubrication,
- Unusual wear or other misuse.
- Contact between incompatible materials.
- Destructive testing.
- Misalignment.
- Excessive weathering.
- Unprotected storage.
- Improper shipping or handling.
- Theft.
- Vandalism.

END OF SECTION 01040

## SECTION 02070

### MINOR DEMOLITION FOR REMODELING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Removal of designated building equipment and fixtures, and disposition of debris legally off-site.

##### 1.2 RELATED SECTIONS

SECTION 01010	SUMMARY OF WORK
SECTION 01020	ALLOWANCES
SECTION 01040	PROJECT COORDINATION

##### 1.3

- A. Submit schedule indicating proposed sequence of operations for selective demolition work to Owner for review and approval prior to commencement of work. Include method of demolition and plan for remodeling work, coordination for shut-off, capping, continuation of utility services as required, together with details dust noise control protection.
- B. Certification: Submit copy of demolition firms' current license to operate in Broward County, Florida.
- C. Coordinate with Owner's continuing occupation of portions of existing building and with Owner's partial occupancy of completed new addition, alteration, and renovation.

##### 1.4 PROJECT RECORD DOCUMENTS

- fi Û Submit under "Closeout Submittals".
- fi Û Accurately record actual locations of capped utilities, subsurface obstructions, and unanticipated structural, mechanical and electrical elements uncovered during demolition.

##### 1.5 QUALITY ASSURANCE

- A. Organize and perform demolition work to avoid damage to construction intended to remain.



- B. Handle waste materials as specified Waste Management.
- C. Demolition and Transportation of Debris: Shall comply with applicable codes and regulations governing these operations. Fees are paid by the Contractor.
- D. Conduct demolition and removal operations in an expedient manner, with precautions taken to prevent demolition site from being an "attractive nuisance."
- E. Notify the Board and A/E of any conditions capable of affecting the safety of occupants of adjacent buildings, the normal use of these facilities, or the physical condition of the structures.
  - 1. In case of accidental disruption of utilities or the discovery of previously unknown utilities, stop work immediately and notify the Board and A/E.
  - 2. Do not continue work until the Board, A/E and Contractor agree on a plan to correct the situation or identify utility service line.

## **1.6 REGULATORY REQUIREMENTS**

- A. Conform to Florida Building Code, including applicable supplements for demolition work, safety of structure, dust control and safeguards required during construction.
- B. Notify affected utility companies before starting work and comply with their requirements.
- C. Do not close or obstruct egress width to exits.
- D. Do not disable or disrupt building fire or life safety systems without 3 day prior written notice to the Owner.
- E. If the Contractor believes asbestos bearing or other hazardous products have been encountered during demolition, immediately stop work in the affected area. Evaluate the affected area and notify the Owner. Do not resume Work in the affected area until written direction from the Owner is received.
- F. Lead Safety: Beginning April 22, 2010, federal law (EPA's Final Rule 40 CFR Part 745) shall require that contractors and renovators performing renovation, repair, and painting projects that disturb lead based paint in homes, child care facilities, and schools built before 1978 that a child under age 6 visits regularly, to be certified and follow lead-safe work practices to prevent lead contamination. Contractors and renovators must be EPA Certified and projects must comply with the EPA manual "Renovate Right, Important Lead Hazard Information for Families, Child Care Providers and Schools".

## **1.7 SEQUENCING**

- A. Sequence work in phases under the provisions of Section 01110, "Summary of Work".

## **1.8 SCHEDULING**

- A. Schedule work under the provisions of Section 01110, "Summary of Work".
- B. Schedule demolition work in gymnasium area to coincide with time restrictions for interior work as specified in Section 01110, "Summary of Work".
- C. Describe demolition removal procedures and schedule.

## **1.9 JOB CONDITIONS**

- A. Owner will be continuously occupying areas of building and site immediately adjacent to areas of selective demolition. Conduct demolition work in manner that will minimize disruption of Owner's normal operations. Provide minimum of five (5) working days advance notice to Owner of demolition activities, which will severely impact Owner's normal operations.
- B. Existing work not specified for removal that is temporarily removed, damaged exposed or in any way disturbed or altered by removal work shall be repaired, patched, or replaced to the Board and A/E's satisfaction at no additional costs to the Board.
- C. Provide barriers and warning devices to protect the public and users of adjacent facilities.
- D. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.

## **PART 2 PRODUCTS**

**## Not Used ##**

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Cover, protect adjacent finished building surfaces (walls, floors, ceilings, etc.), furniture, equipment and fixtures to remain from soiling or damage when selective demolition work is performed in rooms or areas from which items have not been removed.
- B. Erect; maintain dust-proof partitions, closures as required to prevent spread of dust or fumes to occupied portions of the building.
- C. Where selective demolition, which will create excessive dust, occurs immediately adjacent to or within occupied portions of building, construct dust-proof partitions or barriers to mitigate spread of airborne dust or debris.

- D. Provide weatherproof closures for exterior openings resulting from selective demolition work.
- E. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
- F. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of five (5) working days advance notice to Owner if shutdown of services is necessary.

### **3.2 DEMOLITION REQUIREMENTS**

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with selective demolition schedule, governing regulations.
- B. Cease operations, evacuate, and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determinations is made for continuing operations.
- C. Maintain protected egress and access to the work.

### **3.3 DECONSTRUCTION**

- A. Inspect and evaluate existing materials indicated for reuse on site.
- B. Disassemble existing construction scheduled to be removed for recycling or reuse.
- C. Salvage materials for recycling and reuse as indicated.
  - 1. Materials scheduled for reuse and recycling off site per Waste Management".

### **3.4 DEMOLITION**

- A. Disconnect, remove, cap, and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members and all items to remain.
- C. Promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
- D. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate, measure both nature, extent of the conflict. Submit report to Owner in written, accurate detail.

- E. Pending receipt of directive from Owner, rearrange selective demolition schedule as necessary to continue overall job progress without delay.

### **3.5 SALVAGE ITEMS**

- A. Existing equipment, fixtures stored on site, protected under cover, as indicated on drawings or as directed by Project Consultant or Owner, for re-use stored on site, protected under cover, reinstalled by contractor as required.

### **3.6 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Remove debris; rubbish other materials resulting from selective demolition operations from building site. Legally transport, recycle, or dispose of materials off site on a regular basis.
- B. Accumulation of debris on the site will not be allowed.
- C. Burning of removed materials will not be permitted on project site.

### **3.7 REPAIR**

- A. Repair demolition performed in excess of that required. Return damaged structures, surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction on surfaces soiled or damaged by selective demolition work.

### **3.8 CLEAN UP**

- A. Upon completion of selective demolition work, remove tools, equipment, and demolished materials from site. Remove protections, leave interior areas broom clean.

**END OF SECTION**

## **SECTION 02720 (33 40 00)**

### **STORM DRAINAGE**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Storm drainage piping, fittings and accessories.
- B. Connection of building storm water drainage system to on-site drainage system.
- C. Catch basins, paved area drainage, manhole access, site surface drainage and sodded area drainage.

##### **1.2 RELATED SECTIONS**

- A. Section 02200-Earthwork.
- B. Section 02730-Sanitary Sewerage.
- C. Section 03300-Cast-in-Place Concrete.
- D. Section 15105-Plumbing Piping.

##### **1.3 REFERENCES**

- A. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. AASHTO M36-831, Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.
  - 2. AASHTO M145-82, Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.
  - 3. AASHTO M196-831, Corrugated Aluminum Alloy Culverts and under drains.
  - 4. AASHTO T180-831, Moisture-Density Relations of Soils Using a 10-pound Hammer and an 18-inch Drop.
- B. American National Standards Institute (ANSI):
  - 1. ANSI A21.11-85, Rubber Gasket Joints for Cast Iron and Ductile-Iron Pressure Pipe and Fittings.
- C. American Society for Testing Materials (ASTM):
  - 1. ASTM A48-83, Specifications for Gray Iron Castings.
  - 2. ASTM A74-87, Specifications for Cast Iron Soil Pipe and Fittings.
  - 3. ASTM A615-87, Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 4. ASTM C14-82, Specifications for Concrete Sewer, Storm Drain and Culvert.
  - 5. ASTM C76-85a, Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
  - 6. ASTM C144-84, Specification for Aggregate for Masonry Mortar.
  - 7. ASTM C150-86, Specification for Portland cement.
  - 8. ASTM C270-86b, Specification for Mortar for Unit Masonry.
  - 9. ASTM C361-85a, Specification for Reinforcement Concrete Low-Head Pressure Pipe.

10. ASTM C443-85a, Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
11. ASTM D2321-83a, Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
12. ASTM D2774-72 (83), Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.
13. ASTM D3034-85a, Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

#### **1.4 REGULATORY REQUIREMENTS**

- A. Conform to all applicable, State Drainage District and Broward County Codes and Regulations for installation of this Section's Related Work.

#### **1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01330, "Submittal Procedures".
- B. Submit manufacturer's latest published product data indicating materials, dimensions, finish, fittings and fastenings, specifications and accessories.

#### **1.6 PROJECT RECORD DOCUMENTS**

- A. Submit documents under provisions of Section 01780, "Closeout Submittals".
- B. Accurately record location of pipe runs, connections, catch basins and invert elevations.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Pipe:
  1. Concrete Pipe: ASTM C14, Class 1; unreinforced; inside nominal diameter as indicated on Drawings, bell and spigot end joints.
  2. Reinforced Concrete Pipe (RCP): ASTM C76, Class 1 with Wall Type A; bar reinforcement; inside nominal diameter as indicated on Drawings; bell and spigot end joints, as modified by Section 941, FDOT Standard Specifications.
  3. Plastic Pipe: ASTM D3034, Type PSM SDR – 35, polyvinyl chloride (PVC) material; inside nominal diameter as indicated on Drawings, bell and spigot style water tight joint.
  4. Corrugated Aluminum Pipe (CAP): conforming to AASHTO M196 for circular corrugated pipe of AASTO M211 for helically corrugated pipe, and Section 945, FDOT Standard Specifications.
- B. Corrugated Steel Pipe (CSP): Conforming to AASHTO M36 and Section 943, FDOT Standard Specifications.
- C. Pipe Joints:
  1. PVC Pipe: Rubber gasket joint device, Perma-Loc PS-10 push on rubber gasket.
  2. Concrete Pipe: ASTM C443, rubber compression gasket joints or rounded rubber gaskets conforming to the requirements of ASTM CC361, with the additional requirements that the gasket used to be of such cross sectional

area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used, and be the sold element relied on to maintain a tight joint.

3. Reinforced concrete Pipe: ASTM C443, rubber compression gasket joint.
  4. Corrugated Aluminum Pipe: make field joints in CAP with bands fabricated of the same alloy as the culvert sheeting and conforming to the requirements of AASHTO M196. Gasket the banded joints with a neoprene gasket of the design indicated to secure a soil-tight or watertight joint.
  5. Corrugated Steel Pipe: Make field joints in CSP with bands fabricated of the same alloy as the culvert sheeting and conforming to the requirements of AASHTO M36. Gasket the banded joints with a neoprene gasket of the design indicated to secure a soil-tight or watertight joint.
- D. Inlets, Manholes and Junction Boxes:
1. Fabricate from precast concrete conforming to ASTM C478 and C65T. All concrete to have a minimum compressive strength of 3000 psi at 20 days.
  2. Join structure sections with a mastic-sealing compound. Fill the remaining space with cement mortar and finish so as to produce a smooth continuous surface inside and outside the wall sections.
  3. Cast all openings in the precast structure at the time of manufacturer. Make holes for piping size 6 inches larger than the outside diameter of the proposed pipe. Fill all spaces between the manhole and the pipe with mortar and finish smooth.
  4. All drainage structures located within sodded areas must be equipped with 4 inch thick and 4 feet wide concrete.
- E. Gratings:
1. Iron Frames. Grates and Lids: Conforming to ASTM A48, Class 30. Castings: true to design, dimension, weight and detail as indicated on the Drawings.
- F. Forms:
1. Forms for cast-in-place headwalls or other concrete structures to be of wood or metal, designed and constructed so that they may be removed without damage to the concrete. Build forms true to line and grade. Brace forms in a substantial and unyielding manner.
- G. Concrete:
1. Use Class 1 concrete for headwalls, pipe endwalls, and other miscellaneous concrete items. Unless indicated otherwise, the minimum compressive strength for Class 1 concrete is to be 3000 psi in 28 days.
- H. Concrete Reinforcement:
1. Concrete reinforcement in sizes No. 3 and larger to be deformed steel bars of the shapes and sizes indicated on the drawings.
  2. Steel to be newly rolled stock, substantially free from mill scale, rust, dirt, grease or other foreign matter. Bars: domestic billet steel.
  3. Reinforcing bars to be Grade 60, conforming to ASTM A615, except utility structures and stirrups and ties to be Grade 40.
  4. Deformations on bars for concrete reinforcement are to conform to ASTM A615.
  5. Tie Wire: 16 gage or heavier, black annealed wire.
  6. Metal Accessories: galvanized and sufficient in size and number to rigidly support the reinforcing steel under all conditions.



7. Clean loose rust, grease or any other coating that could interfere with the bond. When the placement of concrete is delayed after the placement of the reinforcing, reinspect and reclean the steel is required.
8. Place all steel reinforcing in the exact positions and with the spacing indicated on the drawings. The clear distance between parallel bars is not to be less than 1-1/2 inch times the bar diameter, and in no case less than 1 inch, nor less than 1-1/3 times the maximum size of coarse aggregate. Unless indicate otherwise on the drawings, lap bars not less than 24 diameters nor less than 12 inches.
9. Minimum Concrete Coverage Over Reinforcement:
  - (a) For footings and slabs deposited against earth: 3 inches
  - (b) For formed surfaces to be exposed to weather, dampness or in contact with ground after removal of forms: 2 inches.
10. Storm Sewer Roof – Drain Leaders: All roof drain Leaders and discharge piping shall be interconnected with the site storm sewer system with clean outs using PVC piping per part 2.1.A.3.
11. Ballast Rock and Pea rock: tested to the ASTM CEI-76, Loss shall not exceed 40 percent.
12. French Drain Aggregate shall be:
  - (a) 1/2 inch to 3/4 inch range for 1/2 inch specification.
  - (b) 3/4 inch to 1-inch range for 3/4 inch specification.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that trench cut is ready to receive work and excavations, dimensions and elevations are as indicated on drawings.
- B. Beginning of installation means acceptance of existing conditions.

### **3.2 PREPARATION**

- A. Hand trim excavations to required elevations. Correct over excavation with fill material.
- B. Remove large stones or other hard matter, which could damage drainage tile or impede consistent backfilling or compaction.

### **3.3 EXCAVATION**

- A. All work shall meet OSHA and State Safety Standards.
- B. General: excavate foundation pits to permit the placing of the full widths and lengths of footings indicated on the drawings, with full horizontal beds. Do not round or undercut corners or edges. Carry excavations to foundation materials satisfactory to the Project Consultant, regardless of the elevation indicated on the drawings. Unless a firm footing can be established on solid rock before such depths are reached, carry it to such additional depth as may be necessary to eliminate any danger of undermining wherever rock bottom is secured, do the excavation in such a manner as to allow the solid rock to be exposed and prepared in horizontal beds for receiving the masonry. Remove all loose and disintegrated rock or thin strata.
  1. Earth Excavation:

- (a) Foundation Material Other Than Rock: when masonry is to rest on an excavated surface other than rock, take special care to avoid disturbing the bottom of the excavation, and do not make the final removal of the foundation material to grade until just before the masonry is to be placed. In case the foundation material is soffit or mucky, the Project Consultant may require excavation to a greater depth and backfilling to grade with approved material under provisions of Section 02300-Earthwork.
2. Removal of Obstructions: remove boulders, logs or any unforeseen obstacles encountered in excavating at no additional cost to the Owner.
3. Rock Excavation: free all rock and other hard foundation material of all loose material, clean and cut to a firm surface; either level, step vertically and horizontally, or serrate, as may be directed by the Project Consultant. Clean out all seams and fill with concrete or mortar.
4. Pipe Trench Excavation:
  - (a) Excavate trenches for pipe culverts and for storm sewers to the required depth and to a width sufficient to provide adequate working room.
  - (b) Place and compact the embankment above the natural ground line for pipe lines placed above the natural ground line, prior to excavation of the trench, to an elevation at least 2 feet above the top of the pipe and to a width equal to 4 diameters.
5. Excavate the trench to the required grade.
6. Where the soils permit, the trench sides are to be vertical up to at least the mid-point of the pipe.
  - (a) For all pipe culverts and storm sewers 24 inches or over in diameter (except side drain), shape the bedding to conform to the outside of the pipe, for a depth of not less than 10 percent of its total height (outside dimensions) and provide recesses to receive the bell.
  - (b) Where wet conditions are such that dewatering by normal pumping methods, including well pointing, would not be effective, then this requirement may be modified by the Project Consultant. Select bedding material, which might be utilized by the convenience of the Contractor in lieu of dewatering, is to be at the Contractor's expense.
  - (c) For all side drain, and for pipe culverts less than 24 inches in diameter, the trench bottom may be either flat or shaped to fit the bottom of the pipe, except as provided for trenches, cut below grade and for areas of unsuitable foundation material. Regardless of the shape of the trench bottom, make excavation for the hubs as required to allow the pipe barrel to rest firmly on the trench bottom.
7. Unsuitable Material: when rock, boulders, or other hard, lumpy or unyielding materials are encountered in the trench bottom, remove them to a depth at least 12 inches below the bottom of the pipe. Remove muck or other soft material considered by the Project Consultant to be unsuitable as foundation for the pipe to the depth required for obtaining a firm foundation and as directed by the Project Consultant.
8. Pipe Bedding: when undercutting is required in order to remove unsuitable material (either hard or soft), backfill the trench to a point 6 inches above the bottom of the pipe, with suitable granular material which will form a firm bed for the pipe, and shape the bottom to fit the pipe. Bedding material to be coarse sand, washed limerock, or other suitable granular material.
9. Compaction: when a pipe trench is undercut in order to remove unsuitable material or for other reasons, bring it to required grade using suitable materials, after which compact the bottom to match approximately the density of the soil in which the trench was cut.

### **3.4 PUMPING**

- A. Perform pumping from the interior of any foundation enclosure in such a manner as to preclude the possibility of any portion of the concrete materials being carried away. No pumping is to be done while concrete is being placed, or for a period of at least 24 hours thereafter, unless it is done from a suitable pump separated from the concrete work by a watertight wall.

### **3.5 BACKFILLING**

- A. Backfill to the original ground surfaced or sub grade surface of openings made for structures, with a sufficient allowance for settlement. If required by the Project Consultant, obtain the material to be used in making the backfill from a source entirely apart from the structure. All materials used for backfill are to be of a quality acceptable to the Project Consultant and be free of large lumps, wood, or other extraneous material.
- B. Heavy construction equipment will not be permitted to cross over culvert or storm sewer pipes until backfill material has been placed and compacted to the finished earthwork grade or to an elevation at least 4 feet above the crown of the pipe.
- C. **Compaction Under Wet Conditions:** where wet conditions do not permit the use of mechanical tampers, perform compaction of the backfill with hand tampers. Only A-3 material will be allowed for use in the hand tamped portions of the backfill. When the backfill has reached an elevation and condition such as to make the use of the mechanical tampers practicable, do the mechanical tamping in such a manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.
- D. **Pipe Culvert and Storm Sewers:** perform backfilling of pipe trenches in 3 stages as follows:
  - 1. **First Stage:** provide adequate compacted fill beneath the haunches of the pipe, using mechanical tampers suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe.
  - 2. **Second Stage:** obtain a well-compacted bed and fill along the sides of the pipe and to a point at least 1 foot above the top of the pipe. The width of backfill and compaction to be done under this stage is to be the width of the portion of the trench having vertical sides; or when no portion of the trench has vertical sides, it is to be to a width at least equal to twice the outside diameter of the pipe.
  - 3. **Third Stage:** backfill the remainder of the trench with suitable material and compact under provisions of the requirements hereinafter.
- E. **Compaction:** place the backfill for the first and second stages above in 6-inch layers (compacted thickness) and compact to 95 percent of maximum density as determined by AASHTO T180. Where the backfill lies within the roadway embankment or sub grade, compact it to the densities specified for these areas.
  - 1. When pavement is to be constructed over the pipe, place the backfill for the third stage in the manner and compact to the degree required for the first and second stages. Where no pavement is to be constructed and vehicular traffic is not to pass over the pipe, compact the third stage backfill to firmness approximately equal to that of the soil adjacent to the pipe trench.

- F. Backfill Under Wet Conditions: where wet conditions are such that dewatering by normal pumping methods would not be effective, the procedure outlined may be used when specifically authorize by the Project Consultant in writing.
  - 1. In such specifically authorized cases, the backfill material used below the elevation at which mechanical tampers would be effective is to be of the A-3 soil classification (based on AASHTO Designation M145).
  - 2. After the pipe is bedded properly, place the A-3 material, and ram and compact beneath the pipe haunches by the use of timbers or hand tampers, and continue hand-tamping during the placing of the backfill reaches an elevation such that its moisture content will permit the use of mechanical tampers.
  - 3. When the backfill has reached such elevation, normally acceptable backfill material may be used and compaction is to be obtained by the use of mechanical tampers.
  - 4. Perform the mechanical tamping in such manner and to such extent so as to transfer the compacting force into the previously hand-tamped fill.
  
- G. Requirements for Thick Lift compaction in Granular Materials: If compaction equipment is available with which the required density can be obtained in thicker lifts than permitted as listed before and upon satisfactory evidence that the proposed equipment will produce work equal in quality to that produced by the specified methods, the Project Consultant may permit placement of granular material of soil groups A-1, A-2 or A-3 in lifts up to a maximum of 3 feet compacted thickness. Furnish equipment and labor to excavate and backfill test pits required to be dug for the performance of density tests.
  - 1. Thick lift compaction procedures will not be allowed for first stage backfilling (beneath the haunches) of pipe culverts and storm sewers.

### **3.6 INSTALLATION - PIPE**

- A. Install pipe, fittings and accessories under provisions of ASTM D2321 and ASTM D2774. Seal joints watertight.
- B. Place pipe on minimum 4-inch deep bed of aggregate. Backfilling shall be done in accordance with F.D.O.T. Specification 125-8.1.1 Standard Specification.
- C. Lay pipe to slope gradients noted on Drawings, with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Install coarse filter aggregate at sides and over top of pipe. Provide top cover to minimum compacted thickness of 12 inches.
- E. Place filter fabric over leveled top surface of filter aggregate cover prior to subsequent backfilling operations. Conforming to Section 985 FDOT, Mirafi Type.
- F. Place filter aggregate in maximum 6 inch lifts, consolidating each lift.
- G. Increase compaction of each successive lift. Refer to Section 02300-Earthwork for compaction requirements. Do not displace or damage pipe when compacting.
- H. Installation of French Drains shall be based on F.D.O.T. Standard Specification Section 445 and select trench aggregate will meet F.D.O.T. Standard Specification 2.01-1.4, Table 1, No. 4 stone.

### **3.7 INSTALLATION – CATCH BASINS, MANHOLES AND CLEANOUTS**

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

**3.8 PAVEMENT REPLACEMENT**

- A. Where existing pavement, curbing, curb and gutter, sidewalk or valley gutter is removed only for the purpose of construction or removing box culverts, pipe culverts, storm sewers, inlets, manholes, etc., replace and restore such pavement, etc. to as good conditions, as determined by the Project Consultant, as before removal, at no additional cost to the Owner. The replaced pavement is to be of the same or similar type as that specified in Section 02745-Flexible and Rigid Paving.

**3.9 PAVEMENT REPLACEMENT**

- A. Field inspection will be performed under provisions of Section 01450, "Quality Control".
- B. Request inspection by governing authority prior to and immediately after placing filter aggregate cover over pipe.

**3.10 PROTECTION**

- A. Protect finished installation under provisions of Section 01750, "Protection of Installed Construction".
- B. Protect pipe and filter aggregate cover from damage or displacement until backfilling is in progress.

**END OF SECTION**

## **SECTION 02660 (33 10 00)**

### **WATER DISTRIBUTION**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Water piping, fitting and accessories.
- B. Connection of building water system to municipal system.

##### **1.2 RELATED SECTIONS**

- A. Section 02110-Site Clearing.
- B. Section 02200-Earthwork.
- C. Section 02720-Storm Drainage.
- D. Section 02730-Sanitary Sewerage.
- E. Division 15: Applicable Sections.

##### **1.3 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A21. 10-82, Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches for Water and Other Liquids.
  - 2. ANSI A21.4-85, Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water.
  - 3. ANSI A21.50-81, Thickness Design of Ductile-Iron Pipe.
  - 4. ANSI A21.51-86, Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- B. American Society for Testing Materials (ASTM)
  - 1. ASTM D2737-85, Specification for Polyethylene (PE) Plastic Tubing.
- C. American Water Works Association (AWWA)
  - 1. AWWA C111-85, Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
  - 2. AWWA C500-86, Gate Valves for Water and Sewage Systems.
  - 3. AWWA C502-85, Dry Barrel Fire Hydrants.
  - 4. AWWA C504-80, Rubber-Sealed Butterfly Valves
  - 5. AWWA C600-82, Installation of Ductile Iron Water Mains and Appurtenances.
  - 6. AWWA C652-86, Disinfecting Water Mains.
  - 7. AWWA C800-84, Underground Service Line Valves and fittings.
  - 8. AWWA C900-81, Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch for Water.

##### **1.4 SUBMITTALS**

- A. Submit product data under provisions of Section 01330, "Submittal Procedures".
- B. Submit product data indicating materials, dimensions, fittings and fastenings, finishes specifications and accessories for review.

## 1.5 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01780, "Closeout Submittals".
- B. Accurately record location of pipe runs, connections and invert elevations.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Pipe:
  - 1. General: All pipe, fittings and specials intended for conveying or transmitting service of treated water is to be designated for a minimum working pressure of 150 psi.
  - 2. Ductile Iron Pipe (DIP): Conforming to ANSI A21.51, with wall thickness Class 52 as specified in ANSI A21.50, unless indicated otherwise on the Drawings.
    - (a) Ductile Iron Pipe to be cement lined and seal coated under provisions of ANSI A21.4. The pipe is to be adapted for use with Class 250 fittings through 12 inches and for Class 150 fittings in sizes 16 inches and over.
  - 3. Polyvinyl Chloride Pipe (PVC): Class 1120 pressure pipe (4 inches through 12 inches) conforming to AWWA C9000 and fabricated from Class 12454-A or Class 12454-B material and conforming with the outside diameter of cast iron pipe with a minimum wall thickness of DR Series 18.
  - 4. Polyethylene Pipe: Polyethylene extrusion compound from which the polyethylene tubing is extruded to comply with applicable requirements for PE-3406 ultra high molecular weight polyethylene plastic material in conformance with AWWA C901. Tubing dimensions and tolerances to correspond with the values listed in ASTM D2737 with a standard dimension ration (SDR) of 9.
- B. Pipe Joints:
  - 1. Joints for Bell & Spigot DIP and Fittings: Mechanical or rubber gasket (either on spigot or in bell) compression type in conformance with AWWA C111. Special fittings and joints to be as indicated on the Drawings for specific installations.
  - 2. PVC Pressure Pipe: Bell & spigot push-on rubber gasket type only. No solvent weld or threaded joints will be permitted.
  - 3. Polyethylene Pipe: Joints to be of the compression type utilizing a totally confirmed grip seal and coupling nut with stainless steel tube stiffener insert.
- C. Valves:
  - 1. Gate Valves: 4 inches and larger in conformance with AWWA C500 and having the following design standards.
    - (a) Iron body, bronze mounted; double disc, non-rising stem, parallel seat type, opening left (counterclockwise).
    - (b) Gate valves 4 inches through 12 inches to have a maximum working pressure of 200 psi and be tested at 400 psi.



- (c) Design the disc mechanism so that the seating pressure is applied equally at 4 separate contact points near the outer edge of each disc or in the case of fully revolving disc valves. Accomplish this by 2 flat rectangular contact strips producing an equivalent effect, the upper contract strip to be faced with stainless steel.
    - (d) End connection type to be determined by the type of pipe used.
  - 2. Gate Valves under 4 inches in size to be bronze gate valves conforming to M.S.S. Standard Practice SP-37. Double disc, non-rising stem, open left (counterclockwise) with operating wheel. Pewter and pot metal operating wheels will not be permitted.
  - 3. Butterfly Valves: designed and manufactured under provisions of AWWA C504 for Rubber Seated Valves Class 150B. Design the operating mechanism so that the valve disk is held rigid when in any position. Fit the valve with a 360 degree 18-8 stainless steel seat offset from the shaft, which is mechanically retained in the body or on the disk of the valve. Mechanical retention is not to be affected by the mating flange.
    - (a) Valve disc to be cast iron or ductile iron. Fit the valve disc or valve body with a resilient seat of synthetic rubber retained with an 18-8 stainless steel clamp ring and stainless bolting. Design the resilient seat with a cross section providing 360-degree mechanical retention against pulling out from between the remaining ring and disc. Pass the retaining ring cap screws through the rubber seal.
    - (b) Rigidly attach the valve disc to the shafts with keys to absolutely eliminate relative motion between the disc and shafting. Make the shaft keys of heat-treated 410 or 416 stainless steel to prevent brinelling of the shaft keys in service. Hold the keys in position with 18-8 stainless nuts. Make the valve shafts from 18-8 stainless steel and offset them from the disc or body seats. Valve shafts 3 inches and smaller to be one-piece through shafts with factory set thruster to center the disc in the seat. Valve shafts larger than 3 inches to be stub shafts, each rigidly keyed to the disc and provided with an adjustable thruster to move the disc and shaft assembly positively in either direction to center the disc in the seat of the valve. Valve operators for valves 24 inches and smaller to be traveling nut or worm gear type fully field adjustable stops so the operator does not have to be disassembled for valve seat adjustment. Valves larger than 24 inches to be equipped with worm gear type operators under provisions of AWWA C504. Valves to open left or counterclockwise.
  - 4. Air Release Valves: Valmatic Model No. 38, inlet size 2 inches with 2-inch brass corporation stop tapped into steel pipe.
  - 5. Valve Boxes: cast iron extension type with not less than 5 inches diameter shaft and with covers marked "Water". The stem of a buried valve to be within 12 inches of finished grade unless indicated otherwise on the drawings.
- D. Tapping Saddies: Bronze, double strap.
- E. Corporation stops, service fittings and curb stops to be brass and of the type approved by the governing Utility Department. Brass fittings to conform to AWWA C800.
- F. Fittings:
  - 1. Cast Iron and Ductile Iron: Conforming to ANSI A21.10. In sizes up to and including 12 inches, Fittings to be Class 250. Fittings for pipe sizes 16 inches and over to be Class 150. Cast iron and iron fittings to be cement lined and seal coated under provisions of ANSI A21.4.

2. PVC: of monolithic construction and of the type specified by the manufacturer of the pipe being used.
  3. No solvent welds will be permitted.
- G. Tapping Sleeves and Valves: Tapping valves for tapping sleeves to conform to the gate valve requirements as specified hereinbefore. Equip the valve with appropriate ends, as indicated on the drawings or specified herein. Tapping sleeve to be heavy cast iron, made in two (2) halves with mechanical joint end connections. Sleeve to be suitable for installation on the specified size, type and class of pipe.
- H. Fire Hydrants:
1. General: comply with AWWA C502 and the following design standard:
    - (a) Fire Hydrants: compression type, opening against the pressure and closing with the line pressure with a 5-1/4 inch minimum valve opening. Equip the hydrant with two 2-1/2 inch hose and one 4-1/2-inch steamer nozzle. All nozzles to have American National Standard Hose thread.
    - (b) Furnish hydrants with a sealed oil or grease reservoir located in the bonnet so that all threaded and bearing surfaces are automatically lubricated when the hydrant is operated. Design and hydrant for disassembly by use of a short disassembly wrench or the hydrant shoe having integral cast tieback lugs on the main valve to permit the main valve assembly and valve seat to be removed without digging or disassembling the hydrant barrel.
    - (c) Furnish hydrants with a breakable feature that will break cleanly upon impact. Feature to consist of a two-part breakable safety flange with a breakable stem coupling. The upper and lower barrels to be fluted and ribbed above and below the safety flange or have an extra strength lower barrel.
    - (d) Hydrant internal valve to be 5-1/4 inch minimum. Pentagonal operating nuts and cap nuts to be 1-1/2 inch point to flat. Plug or omit the drain valve outlets. Hydrants to open counterclockwise. Cast the direction on the top.
    - (e) Equip the hydrant with a 6 mechanical joint base inlet unless indicated otherwise on the Drawings.
    - (f) Fire hydrant spacing and flow requirements to conform to the latest requirements of the Broward County Fire Projection Division's standards and the requirements of the local municipality.

## **PART 3 EXECUTION**

### **3.1 CLEARING**

- A. Clearing necessary for the proper installation of all water lines and appurtenances as indicated on the drawings to be under provisions of Section 02230-Site Clearing.

### **3.2 EXCAVATION**

- A. Excavation necessary for the proper installation of all water lines and appurtenances as indicated on the drawings to be under provisions of Section 02300-Earthwork and Section 02630-Storm Drainage.
- B. Properly sheet and brace the work where necessary. Where wood sheeting, or certain designs of steel sheeting are used, cut off the sheeting at a level 2 feet above

the top of the installed pipe and leave that portion below that level in place. If interlocking steel sheeting or a design approved by the Project Consultant is used, it may be removed providing removed can be accomplished without disturbing the bedding or alignment of the pipe. Repair or replace any damaged pipe, bedding or alignment of the constructed main caused by removal of sheeting.

- C. Excavate pipe trenches to a width, within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation or sheeting if used, of not less than 8 inches not more than 12 inches, except for pipe over 18 inches. Excavate all pipe trenches to a level 6 inches below the outside bottom of the proposed pipe barrel unless otherwise directed by the Project Consultant.
- D. Excavation for appurtenances to be sufficient to provide a clearance between their outer surfaces and the face of the excavation, or sheeting if used, or not less than 12 inches.
- E. Store and dispose of materials removed from the trenches in such a manner that they will not interfere unduly with traffic on public sheets and sidewalks and not placed on private property. In congested areas, remove such materials as cannot be stored adjacent to the trench or used immediately as backfill, to a convenient storage area.
- F. Haul to and use all excess material suitable for use as backfill in areas where not enough suitable materials is available from the excavation.
- G. Remove suitable material in excess of backfill requirements and material unsuitable for backfill from the work and dispose of properly.
- H. Make the excavation width sufficient only for the execution of the work. Determine the depth of excavation at the tap by the depth of the main. Set corporation stops to provide a minimum 24-inch cover on the service lines crossing streets or at such elevation to clear other utilities in the street. Service lines to have a continuous upward slope to the curb stop.

### **3.3 WATER REMOVAL**

- A. When practical, the excavation is to be free from water before pipe or structures are installed. When not practical, work is to be done as directed by the Project Consultant.
- B. Furnish all necessary pumps, under-drains, well point systems and other means for removing water from trenches and other parts of the work. Continue dewatering operations until the backfill has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench.
- C. Disposal of water from the trenches and excavation in such a manner as will not cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, or cause any interference with the use of same by the public.

### **3.4 TRENCH STABILIZATION**

- A. Stabilize trench bottoms, which are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes.

- B. In no event is pipe to be installed when such conditions exist. Correct such conditions so as to provide proper bedding or foundations for the installation at no additional cost to the Owner.
- C. Prior to installation of the pipes into the trench, thoroughly clean the interior of the pipes of all foreign matter. If work is suspended for any reason at any time, place a suitable stopper in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe.
- D. Lay lines straight and maintain depth of cover uniformly with respect to finish grade, whether grading is completed or proposed at time of pipe installation. Where a grade or slope is indicated on the drawings, use batter boards with string line or a laser beam paralleling design grade to assure conformance to required grade. No abrupt changes in direction or grade will be allowed. Immediately remove any pipe found to be defective and replace with sound pipe. Place concrete thrust blocks at all bends, tees, plugs and other fittings to provide lateral support. Thrust blocks to conform to the design indicated on the drawings. Restrained joints may be used in place of thrust blocks with the Project Consultant's approval. Make the joints in all pipelines absolutely tight. The particular joint to be used is to be approved by the Project Consultant prior to installation. Where indicated on the drawings, or where, in the opinion of the Project Consultant, settlement or vibration is likely to occur, bolted mechanical type pipe joints are to be used only.
  - 1. Make up mechanical joints using annealed high strength cast iron bolts and rubber gaskets having either plain or duct tip as recommended by the manufacturer. Lay and joint all types of mechanical joint pipes in full conformance with manufacturer's recommendations. Use torque wrenches as specified in AWWA C111; or spanner type wrenches may be used with the permission of the Project Consultant.
  - 2. Make push-on joints in strict conformance with the manufacturer's recommendations. Lubricant, if required, to be an inert, non-toxic, water-soluble compound incapable of harboring, supporting or culturing bacterial life.
- E. Pipe Deflection: When it is necessary to deflect pipe from a straight line in either the vertical or horizontal plane or where long radius curves are permitted, the amount of deflection is not to exceed 75 percent maximum deflection recommended by manufacturer.

### **3.5 BACKFILLING**

- A. Backfilling, compaction and densities are to be under provisions of Section 02300-Earthwork and Section 02630-Storm Drainage.
- B. Minimum depth of cover over water mains is 36 inches.

### **3.6 SURFACE RESTORATION**

- A. Restore the top surfaces of the backfill to the original or planned conditions. Carefully examine trenches upon the completion of backfilling and remove surface irregularities that are dangerous or obstructive to traffic. Where existing pavement, curbing, curb and gutter, sidewalk or valley gutter is removed for the purpose of construction water mains, etc. Replace and restore such pavement, etc. to as good condition, as determined by the Project Consultant, as before removal, at no additional cost to the Owner. The replacement pavement is to be of the same or similar type as that removed.

### 3.7            **MARKETING SERVICE LOCATIONS**

- A.    Testing: test water mains under provisions of AWWA C600.
  - 1.    Hydrostatic Tests:
    - (a)    After the water has been laid and backfilled, pump it to a pressure of 150 psi and stop all visible leaks by approved methods.
    - (b)    Then conduct a leakage test at the above-mentioned pressure. No installation will be acceptable to the Project Consultant until the leakage is less than the number of gallons per hour as determined by the formula:
  - 2.     $L = ND \times \text{square root of } P$
  - 3.    7400

3.8            In which, L equals the allowable leakage in gallons per hour; N is the approximate number of joints in the section of the main tested; D is the nominal diameter of the pipe in inches; and P is the average test pressure during the leakage test in pounds per square inch. Maintain the test for two (2) hours. Measure the water supplied to the main during the test to maintain the required pressure by a 5/8 inch meter installed on the discharge side of the test pump, or by pumping from a calibrated container. Provide a hose bibb connection to accept the test gage supplied by the Project Consultant. Limit the section of main being tested to a maximum length of 2000 feet or the distance between the two (2) closest valves whichever is greater. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gallon/hour/inch or nominal valve size will be allowed. Any questions pertaining to procedures used during the test will be decided by the Project Consultant.

- 1.    Sterilization: After the water mains have satisfied the leakage requirements specified hereinbefore, flush them through openings of the required size as specified in AWWA C651. Sterilize the main under provisions of the applicable sections of AWWA C601. On main breaks, cut-ins; etc., make a liberal application of calcium hypochloride. Do not put mains into domestic service until after the necessary bacteriological samples have been approved by the applicable regulatory agencies.

### **END OF SECTION**

## **SECTION 02730 (33 30 00)**

### **SANITARY SEWERAGE**

#### **PART 1 GENERAL**

##### **1.1 SYSTEM DESCRIPTION**

- A. Construct and test a complete wastewater collection system.

##### **1.2 SUBMITTALS**

- A. Submit manufacturers' literature and data for all materials.
- B. Submit drawings accurately showing wastewater collection systems and related site improvements in their installed locations prior to the placement of any asphalt or concrete pavement.
- C. Submit complete "as-built" information in the form of Project Record Documents as required by the terms of the Contract.
  - 1. Maintain accurate, clear, legible and complete records forming a true representation of the Work completed and in progress.
  - 2. Provide drawing and specification documentation relative to:
    - (a) Manholes, valves, services, fittings.
    - (b) Vertical and horizontal locations of all fittings, cleanouts, and connection points.
    - (c) Pipe length, size, and material type.
    - (d) Television inspection and other test results.
    - (e) Dimensioned locations and elevations of all other related improvements and system components.
    - (f) Variations between installed construction and delineations contained within the Contractor's Phase III, 100 percent documents.
  - 3. All horizontal and vertical information: Measured and recorded by an independent Registered Surveyor and included in the project Record Documents.
  - 4. Project Record Documents: Signed and sealed by the preparing Professional Land Surveyor registered in the State of Florida and the Contractor's Florida Registered Engineer of Record.

##### **1.3 QUALITY ASSURANCE**

- A. Applicable Codes and Jurisdictional Authorities:
  - 1. Florida Department of Education's State Requirements for Educational Facilities (SREF), Latest Edition.
  - 2. Occupational Safety and Health Administration (OSHA).
  - 3. Manual of Uniform Traffic Control Devices (MUTCD).
  - 4. Broward County Public Health Unit (BCPHU).
- B. Survey Data: Base all elevations on National Geodetic Vertical Datum of 1929 (NGVD).
- C. Inspections:

1. Contractor: notify the municipal or county jurisdictional authorities, Project Consultant, and BCI at least 24 hours prior to arrange the required inspection of the water system.

## **PART 2 PRODUCTS**

### **2.1 PRODUCTS AND MATERIALS**

- A. Sewer Pipe and Fittings:
1. Non-pressure polyvinyl chloride (PVC) pipe conforming to ASTM D3034, SDR 35, with push-on rubber gasket joints.
  2. Fittings and accessories: As manufactured or supplied by the pipe manufacturer and conforming to the following additional requirements:
    - (a) Provide PVC sewer piping having a dimension ratio (DR) of 35 and minimum pipe stiffness (PS) of 46 PSI.
    - (b) Joints:
  3. Integral bell gasketed joint designed for radial compression of the elastomeric gasket inside the bell on the pipe spigot to ensure a positive seal.
  4. Design joint to avoid displacement of the gasket when installed under provisions of the manufacturer's recommendation.
  5. Use lubricants to join pipe as recommended by the manufacturer. Solvent cement joints: acceptable. Joint pipe entirely in the trench under strict provisions of the pipe manufacturer's instructions.
- B. Gaskets:
1. Provide gaskets molded in a circular form or extruded to the proper section and then spliced into circular form, consisting of a properly vulcanized high-grade elastomeric compound.
  2. Basic polymer: Natural rubber, synthetic elastomer or a blend of both.
  3. Manufacture gaskets of materials resistant to domestic sewage.
  4. Apply an adequate compressive force to gasket to affect a positive seal under all combinations of joint tolerance.
  5. Gasket: Depended upon to make the joint flexible and watertight.
    - (a) Pipe and Fittings:
  6. Pipe:
    - (a) Made of PVC plastic having a cell classification of 12454-B or 12454-C or 13364-B (with minimum tensile Modulus of 500,000 PSI) as defined in specification D1784.
    - (b) Uniform in color, opacity, density and other physical properties.
  7. Fittings: Made of PVC plastic having a cell classification of 12454-B, 12454-C or 13343-C as defined in specification D1782.
  8. Compounds with different superior cell classifications are acceptable.
  9. Clean reworked material generated by the manufacturer's own production meeting all requirements of specifications are acceptable.
  10. Pipe and fittings: homogenous throughout and free from cracks, holes, foreign inclusions or other injurious defects.
  11. PVC pipe and fittings showing signs of ultra-violet degradation are not allowed.
  12. Pipe Marking: Mark each standard and random length of pipe with the following information:
    - (a) Manufacturer's Name or Trademark.
    - (b) Nominal Pipe Size.
    - (c) The PVC Cell Classification.

- (d) The Legend "Type P#! DR 35 PVC Sewer Pipe".
- 13. Fittings Marking: Mark fittings with the following information:
  - (a) Manufacturer's Name or Trademark.
  - (b) Nominal Size.
  - (c) The Material Designation "PVC" PSM.
- 14. Adapters: As required by the field conditions.
- 15. Service Plugs: Flexible virgin polyvinyl chloride similar to those supplied by Fernco Joint Sealer Company.

C. Manholes:

- 1. General Construction:
  - (a) Precast concrete with 4000 PSI concrete and grade 40 steel.
  - (b) Other materials may be used upon prior review by the Engineer.
  - (c) Construct manholes to conform with ASTM C478 and the following:
- 2. Minimum wall thickness: 8 inches.
- 3. Minimum inside diameter of base sections: 48 inches.
- 4. Precast reinforced base: 8-inch thick minimum cast monolithically with the bottom section of manhole walls.
- 5. Base slab: Extend a minimum of 4 inches from the outside of the manhole.
- 6. Lifting holes through the structures: Not permitted.
- 7. Minimum height of base sections: Three feet from the bottom of base slab.
- 8. Join manhole sections with a mastic compound or a round compression ring of neoprene material set in annular spaces cast into the spigot end of a bell spigot-type joint:
  - (a) Mastic compound of ring: Uniformly compressed between the positioned sections so as to form a watertight joint.
  - (b) Point up and fill the remaining space in the joint with a dense cement mortar and finish so as to make a smooth, continuous surface inside and outside the wall sections after the sections are assembled.
- 9. Precast Manhole Cones: Terminate at elevations to permit laying up a minimum of 2 and maximum of 4 courses of clay brick under the manhole frame to make allowance for future street grade adjustment.
- 10. Brick for Manhole Construction:
  - (a) Dense, hard burned, common clay brick conforming to ASTM Specification C62 latest revision, except that brick absorption shall be between 5 and 25 grams of water absorbed in 1 minute by dried brick, set flat face down, in 1/8 inch of water.
  - (b) Thoroughly wet all brick before laying up.
  - (c) Lay up with shove joint in full beds, thoroughly slushed up with mortar at every corner.
- 11. Invert Channels:
  - (a) Construction: Smooth and semicircular in shape conforming to inside of adjacent sewer section.
  - (b) Make changes in direction of flow as a smooth curve of as large a radius as the size of the manhole will permit.
  - (c) Changes in size and grade of channels: make gradually and evenly.
  - (d) Form invert channels by 1 of the following methods: Form directly into concrete manhole base, build up with block and mortar, lay half tile in concrete, or lay full section of sewer pipe through manhole and break out top half after the surrounding concrete has hardened.
  - (e) Manhole floor outside of channels: Smooth, and sloped toward channels on a slope of 1 inch per foot.
- 12. Provide stub out for future extensions. Close or plug manhole ends of all stub out.
- 13. Service laterals: Not permitted through manhole walls.



14. Outside drop connections: Required when the vertical distance between pipe inverts exceeds 2 feet. Drop connections: Cast monolithically with the manhole elements.
15. Steps or ladders: Omit unless specifically required by regulatory agency.
16. Sealant:
  - (a) Seal entire inside and outside of the manhole with 2 coats, 8 mil each, of Koppers 300-M Bitumastic Paint.
  - (b) Interior surfaces: cleaned of all dust, oils, compounds and other foreign matter and etched with 18 percent to 20 percent muriatic acid solution.
  - (c) Thoroughly rinse all surfaces with clean, clear water prior to paint application.
  - (d) Dilute acid solution prior to removal from the system.
17. Jointing and Plastering:
  - (a) Mortar: One part Portland Cement and 2 parts of fine sand.
  - (b) For block work, lime not exceeding 20 percent of the cement by volume may be added for workability.
  - (c) Joints: completely filled and free from surplus mortar.
  - (d) Exterior and interior surfaces of block manholes: plaster with 3/4 inch of cement mortar.
18. Seal all openings and joints watertight with non-shrink grout.
19. Castings for manhole frames and covers:
  - (a) Made of clean even grain, tough gray cast iron conforming to ASTM Designation A48 for Class 30, gray iron.
  - (b) Smooth, true to pattern, and free from projects, sand holes, warp and other defects.
  - (c) Machine horizontal surfaces of the frame cover seat and the under surface of the cover which rests upon the cover seat.
  - (d) Rocking any cover after it has been seated in any position in its associated frame: Not permitted.
  - (e) Machining: required only on those frames and covers intended for vehicular traffic.
  - (f) Coat castings with coal tar pitch varnish to make a smooth coating, tough and tenacious when cold, not tacky and not brittle.
  - (g) Cast the words "Sanitary Sewer" on the grates.
  - (h) Set manhole frames and covers so that the top cover is flushed with the finished grade.
  - (i) Ensure the manhole frame and corner type is suitable for the future addition of cast iron rings for upward adjustment of top elevation.
  - (j) Seating surfaces between frames and covers: machined to fit true.
  - (k) Plugging or filling: Not allowed.
  - (l) Pick type-lifting holes: cast into lids, but not through the lid.
  - (m) Provide a sealed locking type lid when a manholes in low lying areas or when an unusual condition exists.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Existing Utilities:
  1. Provide temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the Work.

2. Permanently support, relocate, remove, or reconstruct existing utility structures (such as conduits, ducts, pipe branch connections to main sewers, main drains or other structures) where the grade or alignment of the pipe is obstructed Deviations from the required line or grade: Not permitted.
  3. Contact the "No-Cuts" Center and verify existing utility field locations at least 48 hours prior to beginning any excavation.
  4. Verify the size, location, elevation, and material of all existing utilities within the area of construction.
- B. Unloading Materials: Exercise care in unloading and handling pipe, valves, fittings, and all other material.
- C. Excavation:
1. Excavate pipe trenches to required depths.
  2. In general, water distribution lines have a minimum of 36 inches cover.
  3. If rock is encountered, excavate to a minimum of 6 inches below bottom of pipe, and backfill trench.
  4. Width of trench: Sufficient to allow workmen to perform all operations incidental to constructing the pipeline.
  5. Provide hand dug bell holes to permit proper joint making.
  6. Pipe bearing on rock: Not Permitted.

### 3.2 INSTALLATION

- A. Install sewer pipe under provisions of ASTM D2321 and the Uni-Bell Plastic Pipe Association's "Recommended Practice for the Installation of PVC Sewer Pipe".
- B. Lay pipe commencing at the lowest point, with spigot ends pointing in the direction of flow:
1. Lay all pipes with ends abutting and true to line and grade.
  2. Carefully center pipe and form a uniform invert.
  3. Lay pipe under provisions of manufacturer's requirements.
- C. Lay pipe accurately to the line and grade required for system performance:
1. Clean and dry all surfaces of the portions of the pipe to be jointed or of the factory-made jointing material.
  2. Use lubricant, primers, adhesives, etc. as recommended by the pipe or joint manufacturer's specifications.
  3. Place, fit, join and adjust jointing materials or factory-fabricated joints in such a manner as to obtain a watertight line.
  4. Place sufficient backfill material along each side of the pipe to prevent movement of pipe off line and grade as soon as possible after the joint is made.
- D. Plug exposed ends of pipes to prevent earth, water or other substances from entering the pipe when construction is not in progress.
- E. Neoprene boot with stainless steel accessories: Grout Harco or similar manhole couplings in place with non-shrink grout at each pipe connection into a manhole wall.
- F. Cleanouts: Install at all services exceeding 75 feet in length with cleanouts at the property line, or 5 feet from a building.
- G. All Sewer Service Piping: Six inches in diameter with minimum slope of 0.4 percent and 36 inches of cover, minimum. Flush and lamp entire system.

- H. Test entire system for infiltration and exfiltration: Limit to not more than 0.1 gallons per foot in 24 hours.
- I. Concrete Encasement of Sewer Pipe:
  - 1. Excavate trenches with mechanical equipment.
  - 2. Provide temporary supports consisting of timber, wedges or masonry prior to formation of the encasement to support the pipe in place.
  - 3. Provide temporary supports of minimum dimensions and support the pipe at not more than 2 places, 1 at the bottom of the barrel of the pipe adjacent to the shoulder of the socket, and the other near the spigot end.
  - 4. After completion of jointing of the pipe has been completed, uniformly pour concrete beneath and on both sides of the pipe. Provide uniform encasement of at least 4 inches thick at all points.

### 3.3 FIELD QUALITY CONTROL

- A. Protect pipe during handling against impact shocks and free falls. Keep pipe clean at all times. Do not use pipe that does not conform to the specifications.
- B. Notify the utility company and authorities having jurisdiction at least 48 hours prior to beginning construction in order to arrange inspection of the sanitary sewer.
- C. Sewer Test:
  - 1. On completion of each block or section of sewer, clean, test, and lamp the block or section of sewer:
    - (a) Each section of the sewer: Show a full circle of light between manholes on examination from either end.
    - (b) Each manhole, or other appurtenance to the system: Provide appropriate size and form, be watertight, neatly and substantially constructed, with the top set permanently to exact position and grade.
    - (c) Repairs of deficiencies revealed by inspection: Repair broken or cracked pipe, remove all deposits, with sewers left true to line and grade, entirely clean and ready for use.
    - (d) Sewer Lamping: Witnessed by the regulatory agencies having jurisdiction.
  - 2. Infiltration/Exfiltration:
    - (a) The allowable limits of infiltration or exfiltration for the entire system: Do not exceed a rate of 100 gallons per inch of inside pipe diameter per mile of pipe per 24 hours.
    - (b) House service lines: No additional allowance.
    - (c) The allowable limits of infiltration or exfiltration of manholes: Do not exceed a rate of 4 gallons per manhole per 24 hours.
    - (d) Any part or all of the system may be tested for infiltration or exfiltration as directed by the Project Consultant or other jurisdictional authorities.
    - (e) Prior to testing for infiltration: Pump out system and maintain normal infiltration conditions at the time of testing.
    - (f) Determine the amounts of infiltration or exfiltration by pumping into or out of calibrated drums, or by other methods approved by the Project Consultant or other jurisdictional authorities.
  - 3. Exfiltration test:
    - (a) Conducted by filling the portion of the system being tested, with water, to a level equal to the lowest part of the manhole frame.
    - (b) An air test may be substituted for the water exfiltration test, by the Project Consultant or other jurisdictional authorities.

4. Conduct and run tests continuously for 2 hours on portions of the system not exceeding 3 manhole sections or 1000 linear feet whichever is greater.
  5. Where infiltration or exfiltration exceeds the allowable limits: locate and repair defective pipe, joints, or other faulty construction. Remove and reconstruct as much of the work as is necessary in order to conform to the specified allowable limits.
- D. TV. Inspection:
1. Conduct television inspection of all lines after all other testing has been successfully completed.
  2. Repair the manhole-to-manhole section where defects are found.
- E. Temporary Drainage During Construction:
1. Construct and maintain temporary drainage facilities, which may be required to provide drainage relief for the new construction without causing abnormal or adverse flooding impacts to the existing or new facilities.
  2. Temporary facilities may include swales, pipe, etc. as necessary.
- F. Restoration of Surfaces and Structures:
1. Restore and replace paving, curbing, sidewalks, fences, sod, survey points, or other disturbed surfaces or structures to a condition equal to that before the work was begun.
  2. Restoration of surfaces and structures outside the Owner's property line: Comply with requirements of the applicable governing agencies.
- G. Cleaning Up:
1. Remove surplus pipeline material, tools, temporary structures, etc.
  2. Dispose of all dirt, rubbish, and excess earth off site.

## END OF SECTION

**SECTION 02991**  
**FURNITURE MOVING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Removing and reinstalling furniture in existing building prior to other interior work.

**1.2 RELATED SECTIONS**

- A. Section 07920-Joint Sealants
- B. Section 09900-Paints and Coatings

**1.3 DEFINITIONS**

- A. Furniture (or furnishings): Includes all classroom and administrative area desks, tables, chairs, and other "furniture" and also includes non-fixed equipment, instructional aids, books, toys, and other miscellaneous items not removed prior to this Work by the Owner.

**1.4 SCHEDULE**

- A. Schedule work to coincide with Owner occupancy requirements as specified in Section 01110, "Summary of Work".

**1.5 PRE-MOVING CONFERENCE**

- A. Convene a pre-moving conference 1 week prior to commencing work of this Section.
- B. Require attendance by the Contractor, Project Consultant, the Facilities Project Manager, the School Principal, and the School Head Custodian.
- C. Discuss method of predetermining damage to existing structure and furniture; coordinate furniture storage locations, inventory methods, and staging furniture moves to facilitate Owner's operations and Work required by other sections.
- D. Review requirements for the Owner to secure or remove any salvageable or valuable items from spaces affected by the Work.
- E. Note any special equipment requiring specific disconnection and storage (such as computers, and other electronic equipment). Coordinate schedule for Owner's removal of such equipment.

**PART 2 PRODUCTS**

City of Tampa, Florida  
Kid Mason Community Center

Section 02991  
Furniture Moving  
07-15-2022

## **2.1 EQUIPMENT**

- A. Equipment: As required to achieve a successful move of furniture.

## **2.2 MISCELLANEOUS ACCESSORIES**

- A. Provide pads, packing materials, and other accessories with which to ensure protection of moved items.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- A. Conduct pre-move inspection of entire project location with Project Consultant and school based personnel assigned by the School Principal.
- B. Note any damage to existing structure and furniture.
- C. Note any items that must be secured or removed from Work affected spaces. Project Consultant will coordinate with School Principal concerning spaces that are not ready for Contractor's work.

### **3.2 PREPARATION**

- A. Tag or identify furniture to be removed from school spaces to facilitate return of furniture to original placement.
- B. Ensure placement of barricades, barriers, and other safeguards as required in Section 01560, "Temporary Barriers and Enclosures".
- C. Coordinate with Owner concerning temporary storage and staging areas.
  - 1. Furniture storage outdoors: Not allowed.
  - 2. Furniture storage in areas used for paint storage or for other construction materials: Not allowed.

### **3.3 PROTECTION**

- A. Protect existing building, furniture, classroom aids, equipment, and other room contents from damage during moving operations.
- B. Maintain protection of moved items during storage intervals and after relocation.

### **3.4 MOVING**

- A. Relocate furniture to temporary storage or staging area as prelocated and coordinated with Owner.
- B. Maintain stored furniture in safe, clean condition.

### **3.5 FURNITURE RELOCATION**

- A. After Owner's inspection and acceptance of other interior work in individual rooms, relocate stored furniture to original respective locations.
- B. Place furniture in locations and in classroom arrangements as before move.

**3.6 CLEANING**

- A. Remove protective materials from moved items.
- B. Thoroughly and carefully remove tape and adhesives from all surfaces.
- C. Protect surfaces from damage during cleaning to avoid mars, tears, and discoloration.
- D. Vacuum carpeted floor surfaces after relocation of classroom furniture and equipment.
- E. Mop resilient and tile floor surfaces after relocation of classroom furniture and equipment.
- F. Clean and retouch painted wall surfaces damaged as a result of moving operations under provisions of Section 09900-Paints and Coatings.
- G. Provide final cleaning under provisions of Section 01740, "Cleaning".

**3.7 PROTECTION**

- A. Protect new and existing interior finishes and relocated furniture until completion of operations in all spaces within school.

**END OF SECTION**

**SECTION 03100**  
**CONCRETE FORMWORK**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES:**

- A. Formwork for cast-in-place concrete or tilt-up-concrete, with shoring, bracing and anchorage.
- B. Openings for other affected work.
- C. Form accessories
- D. Setting of embeds in concrete.
- E. Stripping forms.

**1.2 RELATED SECTIONS:**

- A. 03200 - Concrete Reinforcement
- B. 03300 - Cast-in-Place Concrete
- C. 04200 - Concrete Unit Masonry

**1.3 REFERENCES**

- A. ASTM International:
  - 1. D994 Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
  - 2. E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls or as Ground Cover.
- B. Codes and Standards: Comply with the following codes, specifications, and standards, except where more stringent requirements are shown or specified (Current Edition U.O.N.):
  - 1. ACI 117 Tolerances for Concrete Construction and Materials.
  - 2. ACI 301 Specifications for Structural Concrete for Buildings.
  - 3. ACI 318 Building Code Requirements for Reinforced Concrete.
  - 4. ACI 347 Recommended Practice for Concrete Formwork.

**1.4 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Formwork Engineer: Professional engineer, with Florida license and experience in design of formwork and related items.
  - 2. Formwork Contractor: Florida licensed contracting firm having 5 years successful experience in fabrication and erection of formwork systems of similar scope and complexity as required for this project.



Contractor shall have sufficient capacity to produce formwork without causing delay in work.

## 1.5 FORMWORK AND RESHORING DESIGN

### A. Formwork:

1. Comply with ACI 301
2. Formwork engineer shall perform or oversee design, drawings, erection, and removal.
3. Design formwork, shores and reshores according to ACI 117 and ACI 347, including provisions for construction loads and placing equipment to be used on project.
4. Verify strength and stiffness of in-place building elements to resist required loads and restrict deformations to specified tolerances.
5. Earth cuts shall not be used as forms for vertical surfaces. Comply with OSHA's "Trench Safety Act".
6. Design and Installation of Formwork: Form ties that leave through holes in the concrete are not allowed.

### B. Removal Strength:

1. Wall forms and column forms may be removed 12 hours after pouring.
2. Slabs supported by precast joists may have forms removed as follows, but not earlier than required by the pre-cast manufacturer or formwork engineer:
  - (a) Joist spacing 4'-6" or less, 24 hrs.
  - (b) Joist spacing between 4'-6" and 6'-8", 48 hrs.
  - (c) Joist spacing between 6'-8" and 8'-8", 72 hrs.
3. Beams and other slabs shall not have forms removed until the concrete has achieved 75 percent of its design strength or as otherwise required by ACI 347. Beams shall be reshored immediately upon removal of forms.
4. In addition to the above, flat slab forms and stair slab forms shall not be removed for 5 days. Upon removal of forms, reshores shall be placed and remain in place until concrete is 14 days old or as otherwise required by the formwork engineer.
5. Where side forms of walls, beams, or columns are supported other formwork, the removal time for the latter shall govern.
6. Supporting forms and shores must not be removed from beams, floors, columns and walls until these structural units are strong enough to carry their own weight and any approved superimposed loads.
7. Strength of concrete shall be determined from testing of job-cured concrete cylinders. Cost of cylinder casting and testing of job-cured specimens cast for this use shall be borne by the contractor.

### C. Reshoring:

1. Design reshoring to resist active loads.
2. Space shoring so no lower floor or member will be excessively loaded from design live loads or will induce tensile stress in concrete members where no reinforcing steel is provided.

3. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.
4. Consider special loading requirements to support load of special elements where elements of similar size and capacity do not exist in supporting structure below.

## **1.6 FORMWORK SUBMITTALS**

- A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items.
- B. Formwork:
  1. Submit shop drawings, signed and sealed by formwork engineer, for fabrication and erection of specific finished concrete surfaces as indicated. Show construction of forms as required. Shoring drawings are required for all elevated concrete work.
  2. A/E'S review is for general applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility, and will not be reviewed.
- C. Shoring/Reshoring:
  1. Submit shop drawings, signed and sealed by formwork engineer, for shoring/reshoring system showing:
    - (a) Arrangement, bracing and sequencing of shores/reshores required.
    - (b) Design load allowances (vertical and lateral) and thicknesses of all members supported.
    - (c) Types of shoring/framing material to be used including catalog cuts of systems/components (if used).
    - (d) Specific areas where shores/reshores do not align vertically.
    - (e) Required installation procedures.
    - (f) Removal criteria.
- D. Foundations for Formwork and Shoring/Reshoring:
  1. Submit shop drawings, signed and sealed by formwork engineer, or include with formwork and shoring/reshoring shop drawings, showing:
    - (a) Sub grade preparation required including compaction and moisture control.
    - (b) Size and description of sill assemblies.
- E. Formwork Removal:
  1. Authorization for Removal: Formwork engineer shall furnish a signed and sealed report establishing the criteria for removal of formwork, shoring, and reshoring. Deviation from established criteria is not allowed.

## **PART 2 PRODUCTS**

### **2.1 FORM MATERIALS**

- A. Forms for Exposed Finish Concrete:
  - 1. Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, or other acceptable panel-type materials. Provide continuous, straight, smooth, exposed surfaces. Earth forming for foundations is prohibited, except for monolithic footings.
  - 2. Furnish in largest practicable sizes to minimize number of joints and to comply with joint system shown on drawings.
  - 3. Provide form material with sufficient thickness to withstand pressure of newly placed concrete, restricting bow and deflection to specified tolerances.
  - 4. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
  - 5. Where concrete is scheduled to have Smooth Rubbed Finish (Sm Rb-Fn), use plywood complying with U.S. Product Standard PS-1 "B-B (Medium Density Overlaid Concrete Form)", Class I, with each piece bearing legible inspection trademark.
  
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces to be concealed in finished structure with plywood, lumber, metal, or other material.
  
- C. Forms for Textured Finish Concrete:
  - 1. Form textured finish concrete surfaces with units of face design, arrangement, and configuration as shown on drawings or as required to match A/E'S control sample.
  - 2. Provide form supports to ensure stability of textured form liners.
  
- D. Cylindrical Columns and Supports:
  - 1. Form round-section members with paper or fiber tubes, constructed of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection.
  - 2. Prefabricated fiberglass or steel forms may be used.
  - 3. Provide units with sufficient wall thickness to resist loads imposed by wet concrete and restrict deformation to specified tolerances.
  
- E. Form Ties: Ties that leave plastic tube lined holes through members are not allowed. Provide factory-fabricated adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete. Provide units that will leave no metal closer than 1 and 1.5 inches to exposed surface. Provide ties that will leave holes no larger than 1 inch diameter in concrete surface.
  
- F. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.
  
- G. Forming Accessories: CRD-C572-74 polyvinyl chloride (PVC).

1. Waterstops: Flat dumbbell type at construction joints and center bulb type at building expansion joints.
  2. Chamfers: 1/2 inch radius on outside corners of exposed-to-view concrete unless drawings show other size or shape.
  3. Drips: 3/8 inch wide x 1/2 inch high drip groove placed 3/4 inch back from edge in cast-in-place exterior soffits.
- H. Premolded Expansion Joint: ASTM D994, 1/2 inch thick.
- I. Vapor Retarder:
1. Provide moisture retarder cover over prepared base material where indicated.
  2. Use polyethylene sheet not less than 10 mils thick or other materials resistant to decay when tested according to ASTM E154.

### **PART 3 EXECUTION**

#### **3.1 FORMS**

- A. Erect, support, brace, and maintain formwork to support applied vertical and lateral loads until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position.
1. Formwork shall be coated with a form release which will not stain or damage the concrete. The form release shall be applied prior to the installation of any reinforcing steel.
  2. Design formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials. Formwork shall be designed to support pressure resulting from placement and consolidation of the concrete. Design of formwork is the responsibility of the Contractor.
  3. Construct forms to sizes, shapes, lines, and dimensions shown to obtain accurate alignment, location, grades, and level and plumb work in finished structures.
  4. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work.
  5. Use selected materials to obtain required finishes.
  6. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
  7. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
  8. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
  9. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
  10. Provide temporary opening where interior area of formwork is inaccessible for clean out, for inspection before concrete placement, and for placement of concrete.

- (a) Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar.
  - (b) Locate temporary openings on forms at inconspicuous locations.
11. Chamfer exposed corners and edges as shown on Drawings, using wood, metal, PVC, rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints. Provide corners and edges with 1/2 inch radius PVC accessories to produce uniform smooth lines and tight edge joints, unless otherwise indicated or accepted by A/E.
12. Form Ties:
- (a) Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
  - (b) Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2 inch inside concrete.
  - (c) Unless otherwise shown, provide form ties that will not leave holes larger than 1-inch diameter in concrete surface.
13. Provisions for Other Trades:
- (a) Provide openings in concrete formwork to accommodate work of other trades.
  - (b) Determine size and location of opening, recesses, and chases from trades providing such items.
  - (c) Accurately place and securely support items built into forms.
  - (d) Accurately place and securely anchor embeds prior to the placing of concrete.
14. Cleaning and Tightening:
- (a) Thoroughly clean forms and adjacent surfaces to receive concrete.
  - (b) Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed.

### 3.2 JOINTS

- A. Construction Joints: Locate and install construction joints not shown on drawings to not impair strength and appearance of the structure, as acceptable to A/E.
- B. Provide keyways at least 1-1/2 inch deep in construction joints in walls, slabs, and between walls and footings. Accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.
- D. Waterstops:
  - 1. Provide waterstops in construction joints as indicated.
  - 2. Install waterstops to form continuous diaphragm in each joint.
  - 3. Make provisions to support and protect exposed waterstops during progress of work.

4. Fabricate field joints in waterstops according to manufacturer's printed instructions.
5. Isolation Joints in Slabs-on-Ground:
  - (a) Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.
  - (b) Joint filler and sealant materials are specified in Division 7 sections of these specifications.
6. Contraction (Control) Joints in Slabs-on-Ground:
  - (a) Construct contraction joints in slabs-on-ground to form panels of patterns as shown on drawings.
  - (b) Use inserts 1/4 inch wide x 1/4 of slab depth, unless otherwise indicated.
  - (c) Form contraction joints by inserting premolded hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. After concrete has cured, remove inserts and clean groove of loose debris.
  - (d) Contraction joints may be formed by saw cuts (when permitted by the drawings) as soon after slab finishing as possible without dislodging aggregate or tearing or raveling the concrete. Depth of cut shall be 1/4 of slab depth.

### **3.3 RE-USE OF FORMS**

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing materials are not acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to A/E.

**END OF SECTION**

## SECTION 03200

### CONCRETE REINFORCEMENT

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Steel reinforcement for cast-in-place concrete, tilt-up-concrete, and reinforced masonry.

##### 1.2 RELATED SECTIONS:

- A. Section 01572-Construction Waste Management.
- B. 03100-Concrete Formwork.
- C. 03300-Cast-in-Place Concrete.
- D. 04200-Concrete Unit Masonry.

##### 1.3 REFERENCES

- A. ASTM International:
  - 1. A82 Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - 2. A184 Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
  - 3. A185 Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
  - 4. A496 Specification for Steel Wire, Deformed, for Concrete Reinforcement.
  - 5. A497 Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
  - 6. A615/A97 Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 7. A706/A706M Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
  - 8. A775 Specification for Epoxy-Coated Reinforcing Steel Bars.
- B. Codes and Standards: Comply with the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. ACI 117 Tolerances for Concrete Construction and Materials.
  - 2. ACI 301 Specifications for Structural Concrete for Buildings.
  - 3. ACI 315 Details and Detailing of Concrete Reinforcement.
  - 4. ACI 318 Building Code requirements for Reinforced Concrete.
  - 5. ACI 439 Mechanical Connection of Reinforcing Bars.
  - 6. AWS D1.4 Structural Welding Code Reinforcing Steel.
  - 7. CRSI "Manual of Standard Practice".
  - 8. CRSI "Placing Reinforcing Bars".
  - 9. Wire Reinforcement Institute "Manual Standard Practice".

- C. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

#### 1.4 QUALITY ASSURANCE

- A. Steel Contractor: Florida licensed contracting firm having 5 years successful experience in fabrication and erection of reinforcing steel of similar scope and complexity as required for this project. Contractor shall have sufficient capacity to install reinforcing steel without causing delay in work.

#### 1.5 SUBMITTALS

- A. Product Data:
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. General:
  - 1. Submit shop drawings for fabrication, bending, and placement of concrete reinforcement.
    - (a) Comply with ACI 315 showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement and accessories.
    - (b) Include special reinforcement required at openings through concrete structures.
- C. Shop drawings made from sepias (or other reproductive methods) of the structural drawings will not be accepted and shall be cause for resubmittal.
  - 1. Selection of splices: Splices shall be full tension, unless noted otherwise.
- D. Splices noted on the drawings to be compression splices shall be furnished by one of the following:
  - 1. Compression lap splices according to ACI 315. Mechanical compression only connectors according to ACI 439, staggered 1/2 Class "B" lap length and maintaining not less than 1/4 the total tensile capacity of any column face.
  - 2. Full penetration welds staggered not less than 18 diameters.
- E. Splices shown on the drawings as either Class "A" or Class "B" may be one of the following:
  - 1. Class "B" lap splices.
  - 2. Class "A" (but not less than compression lap) lap splices staggered not less than one Class "B" lap length.



- (a) Exception: This shall not be allowed when shown as class "B" in a location, which by design, has already accounted for other continuing bars or staggered splices.
- 3. Appropriate mechanical connectors according to ACI 439 staggered not less than 24 diameters.
- 4. Full penetration welds staggered not less than 24 diameters.
- F. Unless otherwise noted in the drawings, reinforcing shall be spliced to develop the full strength of the bar in either tension or compression. Those splices shall be furnished by one of the following:
  - 1. Class "B" lap splices where only 1/2 of the total rebars are spliced at any one floor.
  - 2. Full penetration welds staggered not less than 36 diameters.
  - 3. Appropriate mechanical connectors according to ACI 439-3R staggered not less than 36 diameters.
- G. Total steel at lap splices shall not exceed 8 percent for columns or shear wall cores containing the spliced bars.
  - 1. All bars may be lapped at one section for up to 4 percent steel.
  - 2. 1/2 of the bars may be lapped for up to 5.3 percent steel.
  - 3. 1/3 of the bars may be lapped for up to 6 percent steel.
  - 4. Above 6 percent steel, other splice choices shall be used.
- H. Where staggered lap splices are used, provide a mixture of bar sizes as appropriate where vertical bar size changes on the drawings.
- I. Where different size bars are lap spliced, the length of splice may be based on the smaller bar size. If there is a larger quantity of the smaller bar size, the splice length shall be based on the larger bar.
- J. It shall be the responsibility of the reinforcing detailer to determine the concrete strength at the point of a lap splice, the bar position (top or other), bar spacing, confinement condition based on ties or stirrups or edge condition to select the proper lap length.
- K. Increase laps for bundled bars according to ACI 318, with number based on total bars in-group including lapped bars.
  - 1. Detailing of Splices: Placing shop drawings shall specifically show splice lap lengths where they occur. Bar diameter lap tables and references to other charts are not acceptable.
  - 2. Staggered Laps Required: Provide staggered laps in any member as necessary to keep space between bars within splice zone at least 1 inch or 1 bar diameter clear.
  - 3. Detailing of Bar Placement: For any bar other than those placed at an edge condition, between edge condition or openings, or any other location where the bar cannot be shifted longitudinally, a dimension shall be shown from an identifiable building grid, wall, or edge to at least one end of the bar.
  - 4. Congested Areas of Placement: For any conditions resulting in bar spacing less than 2 diameters clear or where the placement of bars in one member requires critical templating to allow bar placement in an intersecting member, furnish details of sufficient scale to show

- clearances, spacing, and arrangements for properly placing those bars.
5. Accessories: Show accessories, supports, chairs, bolsters, and spacers necessary to complete the installation. Where supports are beyond the scope of CRSI detailing standards and custom designed supports are required, provide engineering calculations demonstrating the capacity of the system.
  6. Flat Plates: Provide not less than 3 separate drawings of each plate separately showing bottom bars, top bars, and accessories.
- L. Welding Submittals:
1. If welding of reinforcing bars is to be included as part of the work, submit the following:
    - (a) A complete welding procedure specification according to AWS D1.4.
    - (b) A certified chemical analysis of the steel to be welded.
    - (c) Carbon equivalence calculations according to AWS D1.4.
    - (d) Qualification papers for welders who will be employed on the project. Welders shall have passed a qualification test within a 12 month period before the work or furnish a statement from a testing agency acceptable to A/E that they have observed or tested that welder's work under similar requirements within the past 6 months.
- M. Alternate Reinforcing Splicing:
1. Splices shown in the drawings shall be considered mandatory for base bid purposes.
  2. Alternative methods of providing for splices are available within the constraints of this specification and ACI 318.
  3. If alternative splices are desired, the shop drawing submitted shall clearly indicate the change and include authorization by any other subcontractors involved in the change.

## **PART 2 PRODUCTS**

### **2.1 REINFORCING MATERIALS**

- A. All manufactured steel reinforcement products are to contain recycled content.
- B. Comply with Chapter 5 of ACI 301.
- C. Reinforcing Steel:
  1. Bars #3 through #11 shall be deformed bars according to ASTM A615 Grade 60 and according to the additional requirements of Paragraph 5.2.2.1 of ACI 301.
  2. Bars #2 in size shall be plain round meeting A615/A-96a Grade 40.
  3. Welded wire fabric shall be of plain wire.
  4. Unless indicated otherwise the minimum concrete protective cover specified in ACI 301 is the specified cover for this project unless indicated otherwise.
    - (a) Epoxy-Coated Reinforcing Bars: ASTM A775.

- (b) Form-Saving Splice Connectors: Flanged devices to allow insertion of threaded reinforcing bars into a previously formed face. Available products include, but are not limited to:
  - (c) Form Saver by Lenton.
  - (d) DB-SAE Splices System by Richmond.
  - (e) Rebar Flange Coupler by Williams.
5. Mechanical Connectors and Splice Devices: Proprietary products suitable for the use intended and listed in ACI 439-3R-83.
  6. Steel Wire: ASTM A82, plain, cold-drawn, steel.
  7. Fabricated Deformed Steel Bar Mats: ASTM A184.
  8. Welded Steel Wire Fabric: ASTM A185.
  9. Deformed Steel Wire: ASTM A496.
  10. Welded Deformed Steel Wire Fabric: ASTM A497.
  11. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI Class C or Class A as required acceptable.
- D. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Maximum spacing of supports is 3 feet in both directions.
- E. For exposed-to-view concrete surfaces and with legs of supports in contact with forms, provide supports with legs, either plastic protected according to CRSI, Class 1 or stainless steel protected according to CRSI, Class 2.
- F. Provide custom supports as required to support top layer of mats and other special conditions not provided for within CRSI standards.

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**NOTE TO SPECIFIER: Include this paragraph when applicable for this project.**  
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- G. Fiber Reinforcement:
- (a) Comply for use in plain concrete as defined in ACI 318 and the following:
  - (b) Fibrous concrete reinforcement: Shall meet ASTM C-1116 Type III 4.1.3 and ASTM C-1116. Shall be 100 percent virgin polypropylene fibrillated fibers containing no reprocessed olefin materials and specifically manufactured for use as concrete reinforcement at a minimum of 0.1% by volume for the control of cracking due to plastic shrinkage and thermal expansion/contraction.
  - (c) Fibers shall not be used as a replacement for any reinforcement required for structural purposes.
  - (d) Blend fibers into the concrete mix according to manufacturer's written instructions.
  - (e) Provide control joints according to ACI 318 and ACI 302
  - (f) Manufacturers: Fibermesh by Synthetic Industries, Chattanooga, TN or accepted equivalent.

## **PART 3 EXECUTION**

### **3.1 PLACING REINFORCEMENT**

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as specified.
- B. Clean reinforcement of loose rust and mill scale, dirt, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers as required.
- D. When any reinforcing bar is placed projecting either horizontally or vertically from a given element to subsequently lap with other reinforcing bar, verify the detailed lap length will be achieved.
  - 1. Report any deviation to the A/E for correction before placing concrete in the first element.
  - 2. Bar projections resulting in laps shorter than the detailed laps shall be considered rejected, and corrective measures shall be taken at the direction of the A/E with no additional cost to the Owner.
- E. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- F. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh plus 2 inches and wire splices. Offset end laps in adjacent widths to prevent continuous laps in either direction.
- G. Provide the A/E with not less than 48 hours notice before starting any welding of reinforcing bars.
  - 1. Welding of reinforcing bars shall only be allowed under the direct supervision of the A/E.
  - 2. Welding of crossing reinforcing bars is not allowed.
  - 3. Any bars with unauthorized or unacceptable welds shall be replaced at no additional cost to the Owner.

**END OF SECTION**

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Normal weight cast-in-place concrete, including production, formwork, reinforcement, mix design, delivery, placement procedures, and finishes.
- B. The Base Specification for cast-in-place concrete is ACI 301. This specification Section is written to supplement the ACI Standards by designation or specifying individual project requirements for materials and performance.

##### 1.2 RELATED SECTIONS

- A. 01572-Construction Waste Management.
- B. 02200-Earthwork: Sub grade and capillary break vapor barrier: placement of drainage.
- C. 03100-Concrete Formwork.
- D. 03200-Concrete Reinforcement.
- E. 03410-Precast Concrete Joists and Beams.
- F. 03470-Tilt Up Construction.
- G. 07121-Fluid Applied Waterproofing Substrate requirements: coordination.
- H. 09310-Ceramic Tile.
- I. 09330-Quarry Tile.

##### 1.3 REFERENCES

- A. American Concrete Institute (ACI).
  - 1. ACI 117-Standard Tolerances for Concrete Construction and Materials.
  - 2. ACI 301-Specifications for Structural Concrete.
  - 3. ACI 302-Guide for Concrete Floor and Slab Construction.
  - 4. ACI 304-Guide for Measuring, Mixing, Transporting and Placing Concrete.
  - 5. ACI 305-Hot Weather Concreting.
  - 6. ACI 306R-Cold Weather Concreting.
  - 7. ACI 309-Guide for Consolidation of Concrete.
  - 8. ACI 318-Building Code Requirements for Reinforced Concrete.
  - 9. ACI 347-Recommended Practice for Concrete Formwork.
- B. ASCE 37-02 Design Loads On Structures During Construction.

- C. ASTM International:
1. A185 Standard Specification for Welded Wire Steel Fabric for Concrete Reinforcement.
  2. A497 Standard Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
  3. A615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  4. C31-Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  5. C33-Standard Specification for Concrete Aggregates.
  6. C39-Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  7. C94-Standard Specification for Ready-Mixed Concrete.
  8. C143-Standard Test Method for Slump of Portland Cement Concrete.
  9. C150-Standard Specification for Portland Cement.
  10. C172-Standard Practice for Sampling Freshly Mixed Concrete.
  11. C260-Standard Specification for Air-Entraining Admixtures for Concrete.
  12. C309-Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete.
  13. C330-Standard Specification for Lightweight Aggregate for Structural Concrete.
  14. C494-Standard Specification for Chemical Admixtures for Concrete.
  15. C618-Standard Specification for Fly Ash and Raw or Claimed Natural Pozzolin for Use as a Mineral Admixture in Portland Cement Concrete.
  16. C989-Standard Specification for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars.
  17. C1116-Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
- D. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

#### 1.4 SUBMITTALS

- A. Mix Designs: Submit mix designs to Engineer for review 20 days before first placement. Do not proceed without Engineer's written approval.
1. Mix design shall include laboratory test results or production records of 30 consecutive tests as defined by ACI 301.
  2. Indicate material content per cubic yard of each class of concrete furnished:
    - (a) Saturated surface-dried weights of fine and course aggregate.
    - (b) Type and name of admixtures.
    - (c) Wet unit weight of each concrete mix.
- B. Certificates:
1. Manufacturer's certification that materials meet specification requirements.
  2. Ready-mix delivery tickets, ASTM C94.
- C. Product Data: Submit product data for all concrete materials and admixtures proposed for use including the following information:
1. Recycled Content:

- (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
- (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
- (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

2. Regional Materials:

- (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
- (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
- (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

- D. Related Materials: Submit product data for all proposed release agents, curing compounds and evaporation reducer, and polypropylene fibers that demonstrate conformance to specification.
- E. Shop Drawings: Indicate floor plan and precise locations of all control joints and construction joints in relation to building grid lines that are not shown on drawings. Submit drawings for reinforcement, for fabrication, bending, and placement of concrete reinforcement. Comply with ACI SP-66 "ACI Detailing Manual" showing bar schedules, stirrup spacing diagrams of bent bars, and arrangement of concrete reinforcement.
- F. Records: Retain records of all concrete poured, including exact mix proportions, slump, air content test, strength, date, time, location of the placement, weather conditions at the time of placement, and the source of concrete. Submit copy to Engineer.

**1.5 QUALITY ASSURANCE**

- A. Reinforced concrete to comply with ACI 301 and ACI 318, and other stated requirements, codes and standards.
- B. Only one source of cement and aggregates shall be used in one structure to insure uniform color and appearance.
- C. Inspection and Tests: Notify Engineer and testing agency of concrete placement, a minimum of 24 hours before placement begins.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Hot weather placements: Follow all of the special procedures in Article “Placing Concrete” below and conform to ACI 305R.PRODUCTS

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MATERIALS**

- A. All concrete materials are to contain recycled content such as fly ash, granulated ground blast-furnace slag, and normal weight aggregates.
- B. Cement: ASTM C150, Type I or Type II; other types as approved.
- C. Supplemental Cement Materials
  - 1. Fly Ash.: ASTM C618, Type F. Not to exceed 20% by weight of total cementitious material
  - 2. Granulated Ground Blast-Furnace Slag: ASTM C989. Not to exceed 30% by weight of cementitious material.
- D. Normal Weight Coarse; Aggregate; ASTM C33
- E. Water: ACI 301. Clean and potable
- F. Admixtures, General: All concrete shall contain a Type A or D admixture in the basic design with dosages high enough to reduce water by at least 7 percent from the same mix without the admixture. No admixture shall have added chloride in its manufacture. Add all admixtures at the concrete batch plant.
  - 1. Air-Entraining agent: Shall conform to ASTM C 260. (if used)
    - (a) MasterAir AE 90 or MasterAir VR 10 by Master Builders.
    - (b) Darex by GCP Applied Technologies.
    - (c) Air Mix by Euclid Chemical Co.
  - 2. Water-Reducing Admixture: Shall conform to ASTM C 494 Type A (if used).
    - (a) MasterPozzolith 200 or MasterPozzolith 322 by Master Builders.
    - (b) WRDA 60 by GCP Applied Technologies.
    - (c) Eucon WR 75 by Euclid Chemical Co.
  - 3. Water-Reducing Retarding Admixture: Shall conform to ASTM C 494 Type D.
    - (a) MasterSet R 961 by Master Builders.
    - (b) WRDA 60 by GCP Applied Technologies.
    - (c) Eucon WR by Euclid Chemical Co.
  - 4. Mid-Range Water-Reducing Admixture: Shall conform to ASTM C 494 Type A or F.
    - (a) MasterPolyheed 997 by Master Builders.
    - (b) Mira 110 by GCP Applied Technologies.
    - (c) Eucon MR by Euclid Chemical Co.
  - 5. High-Range Water-Reducing Admixture (Superplasticizer): Shall conform to ASTM C 494 type F.
    - (a) MasterRheobuild 1000 or PS 1232 by Master Builders.
    - (b) Adva Flow by GCP Applied Technologies.
    - (c) Eucon 37 by Euclid Chemical Co.



6. Fibrous Concrete Reinforcement: Shall meet ASTM C-1116 Type III 4.1.3 and ASTM C-1116. Shall be 100 percent virgin polypropylene fibrillated fibers containing no reprocessed olefin materials and specifically manufactured for use as concrete reinforcement at a minimum of 0.1 percent by volume for the control of cracking due to plastic shrinkage and thermal expansion/contraction.

## **2.2 RELATED MATERIALS**

- A. Liquid Membrane-Forming Curing Compound: Shall be a membrane-forming curing compound complying with ASTM C 309, Type I, except that minimum solid content shall be 30% and moisture loss shall not exceed 0.040 gm/cm<sup>2</sup> of surface in 72 hours at a coverage rate of 2 coats at 300 sq. ft per gallon.
  1. MasterKure 200W by Master Builders.
  2. Super Aqua-Cure VOX by Euclid Chemical Co.
  3. Kure-N-Seal 30 by Sonneborn (BASF).
- B. Epoxy Adhesives: Two component, 100% solids, 100% reactive compound suitable for use on dry or damp surfaces:
  1. MaterEmaco ADH 326 by Master Builders (BASF).
  2. EpoGrip by Sonneborn.
  3. Sika dur-32 Hi-Mod
- C. Epoxy Joint Filler: Two components, 100% solids compound with minimum Shore D hardness of 60 and a maximum of 65.
  1. MasterSet R 300 by Master Builders.
  2. MasterSeal CR 190.
  3. Sikadur 51 by Sika Corp.
- D. Preformed concrete joint filler.
  1. Asphalt Saturated Filler containing post-consumer wastepaper, ASTM D1751.
  2. Recycled Rubber, ASTM D1752.
- E. Moisture-Retaining Cover: Shall be one of the following, complying with ASTM C171.
  1. Waterproof paper.
  2. Polyethylene film.
  3. Polyethylene-coated burlap.
- F. All coating/ sealant shall be compatible with each other and applied floor finishes or be completely removed prior to application of other coating or finish.
- G. Bonding Agent: Shall conform to ASTM C881 Type 2, Grade 2 Class B and C.
  1. MasterBrace 1414 by Master Builders (BASF).
  2. Engineer Approved Alternative.

## **2.3 PROPORTIONING AND DESIGN OF MIXES**

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to

Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

B. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

<u>Concrete Use</u> <u>ratio</u>	<u>Compressive Strength</u>	<u>Maximum water/cementitious</u> <u>ratio</u>
Slab-on-ground and Foundations	3000 psi	.60
Columns, Beams, and all other concrete	4000 psi	.54

C. Slump Limits: Maximum slump of all concrete at point of placement shall be 4 inches except as modified here:

1. Maximum slump of all concrete containing mid-range water-reducing admixture shall be 7.5 inches.
2. Maximum slump of all concrete containing high-range water-reducing admixture shall be 10 inches.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work.

E. Fiber Reinforcement: Concrete for slabs-on-grade shall contain the specified fiber reinforcement at a dosage of 1.5 pounds per cubic yard.

**PART 3 EXECUTION**

**3.1 PREPARATION OF FORMED SURFACES**

A. General: Coat surfaces of forms with non-residual low-VOC form release agent before reinforcement is placed. Do not allow excess form release agent to accumulate in forms or come into contact with in-place concrete surfaces against which concrete will be placed.

**3.2 MIXING: CONCRETE**

- A. Ready-mixed Concrete: Mix and transport in accordance with ASTM C94.
- B. Admixture: Dispense admixtures in mix using automatic dispenser or similar metering device at the batch plant with the type and quantity of admixture printed on the batch ticket.
- C. Addition of water in excess of that prescribed in the approved mix design or that increases slump beyond specified values is not permitted.

**3.3 PLACING CONCRETE**

- A. General: Comply with ACI 304.
- B. Ensure compliance with requirements of ASCE 37-02.
- C. Hot Weather Concreting: In accordance with the current edition of ACI 305.
  - 1. Protect to prevent rapid drying of concrete surface. Start finishing and curing as soon as possible. Use continuous fog sprays or use the specified hot weather evaporation reducer after placement. Apply cure as soon as finishing is complete then protect from sun and wind for at least 24 hours.
  - 2. Allowable Concrete Temperatures: Hot weather: Maximum 95 degrees F. Concrete exceeding this temperature shall be discarded.
- D. Conveying:
  - 1. General: Conform to ACI 301. Convey concrete from mixer to place of final deposit by methods preventing; separation or loss of materials.
  - 2. Equipment: Use pump, crane bucket, wheelbarrow, or buggies to deliver concrete to placing location. Chuting permitted only by method to insure a practically continuous flow of concrete at delivery end to prevent material separation.

### **3.4 DEPOSITING**

- A. Conform to ACI 301. Deposit concrete in or close to its final position. Avoid segregation due to rehandling or flowing. Deposit at rate that concrete is always plastic and flows readily into spaces between reinforcement. Deposit in one continuous operation until panel or section is complete, top surface generally level.
- B. Wall Tops, Horizontal Offsets, Other unformed surfaces: Strike smooth after placing concrete float to continued uniform texture reasonably consistent with adjacent formed surfaces. Tool edges and corners to be exposed in the finished work to approximate  $1/4 =$  radius, unless otherwise detailed.

### **3.5 CONSOLIDATION OF WALLS, COLUMNS, BEAMS AND SLABS OVER EIGHT-INCHES THICK**

- A. All concrete shall be thoroughly consolidated by means of mechanical vibrators. Vibrators shall be in accordance with ACI 309.
- B. Use internal mechanical vibrators with 7000 rpm minimum frequency operated in nearly vertical position, vibration points uniformity spaced, close enough to assure complete consolidation, and at no time over twice the radius over which vibration is visibly effective. Vibration should continue until:
  - 1. Frequency returns to normal.
  - 2. Surface appears liquefied, flattened, and glistening.
  - 3. Trapped air ceases to rise.
  - 4. Coarse aggregate has blended into surface, but has not disappeared.
- C. Penetrate vibrator head into upper portion of underlying plastic layer. Do not over-vibrate so as to cause segregation.
- D. Vibrate around reinforcement, embedded items, and into corners and angles of forms by spading and rodding to exclude rock-pockets, air bubbles and

honeycomb. Never have the vibrator more than 3 feet from the point of discharge into the form.

- E. This mid-range slump concrete will require only 1/2 of the vibration time of 3 inch slump concrete, while high-range slump will require 1/3 of the vibration time of 3 inch slump concrete.

### **3.6 CONSOLIDATION OF SLABS LESS THAN EIGHT- INCHES THICK**

- A. Use vibrating screed.
- B. Use of a “jitterbug” is not allowed unless concrete slump is less than 2 inches.

### **3.7 BONDING CONCRETE**

- A. Apply bonding agent to existing hardened concrete where noted to be bonded to new concrete. Be sure bonding agent is still tacky at the time of placement of new concrete. Prepare surface and install per manufacturer’s instructions.

### **3.8 JOINTS**

- A. Construction Joints:
  - 1. Locate where indicated on Drawings.
  - 2. Make joints perpendicular to principal reinforcement.
  - 3. Unless indicated otherwise, provide longitudinal keys 1 and 1.5 inches minimum depth in walls.
  - 4. Where concrete is to be exposed in finished construction, install rustication strips in formwork to form straight joint line.
- B. Expansion Joints:
  - 1. Unless indicated otherwise, place expansion joints where exterior slabs abut concrete walls, the building perimeter, and other fixed objects abutting or within the slab area.
  - 2. Provide non-extruding filler where sealant is indicated. Allow 1/2 inch for application of sealant.
  - 3. Provide asphalt impregnated filler where sealant is not to be used.
  - 4. Do not extend reinforcement through joint, except as shown on structural drawings.
  - 5. Sealants are specified in Section 07920.
- C. Contraction Joints:
  - 1. Make joints straight perpendicular or parallel to building lines and slab edges, as appropriate.
  - 2. Contraction joints shall be saw cut, unless indicated otherwise. Cut as soon as possible after concrete placement without dislodgment or damage to the slab surface, using test cuts as soon as the concrete will not be damaged by traffic.
  - 3. Contraction joints shall penetrate the slab a minimum 1/4 the thickness of the slab and shall be 3/16 inches in width minimum.
  - 4. Align joints with column lines when ever possible. Joints shall form squares where possible or rectangular panels with the long side less than 1-1/2 times the length of the short side. Provide circular or diamond shaped joint lines around columns. Locate contraction joints

at reentrant corners. Coordinate with placement of joints in tile surface.

5. If joint pattern is not shown on Drawings, or joint plan is not submitted for approval to Engineer, maximum distance between joints shall be 20 feet on center.
6. Fill interior joints as indicated on Drawings with specified joint filler at least 90 days after concrete placement.

### **3.9 FINISHING OF FORMED SURFACES**

- A. Finish surfaces within 96 hours after removal of forms, allowing minimum of 24 hours for curing. After removal of forms and immediately following any required repair and patching finish formed surfaces with one or more of the following finish operations
  1. Form Tie Holes: Do not fill form tie holes, except as required for application of waterproof membrane and/or interior finishing.
  2. As-cast Finish: Completely remove all surface fins by hand or power grinding; with stone to approved smoothness. Clean with light wire brushing.

### **3.10 FINISHING OF FLOOR SLABS**

- A. General:
  1. Finish floor slabs in accordance with ACI 301.
  2. Screed all slabs, for whatever finish, to true levels or slopes work surfaces only to the degree required to produce the desired finish. Do no finishing in areas where water has accumulated; drain and re-screed, do not use cement and sand sprinkling to absorb moisture. Carefully finish all joints and edges with proper tools.
  3. Consolidate placed concrete preferably with power driven floats of impact type use wood floats for surfaces inaccessible to power floats
  4. In areas where drains are indicated, without depressed slab to accommodate subsequent thick bed setting system or leveling course, slope slabs evenly to drains, 1/8 inch per foot in the area within 8 feet of the drain, unless otherwise indicated.
  5. Steel trowel finish only those slab surfaces scheduled to remain exposed in the finished work, and slab surfaces to receive resilient flooring, carpeting, ceramic or quarry tile or other final finish. Grind smooth, surface defects that would telegraph through applied floor covering.
  6. Apply trowel and fine broom finish to slab surfaces to be covered by thinset terrazzo, or ceramic or quarry tile that is to be installed with thinset mortar.
  7. Provide medium broom finish to concrete stair treads, loading docks, and pedestrian areas subject to foot traffic to provide a nonslip finish.
  8. Slabs with excessive shrinkage cracks, curling, and slabs not properly sloped to drains, shall be removed and replaced with complying work, at no additional cost to Owner.
- B. Tolerance: Provide floor tolerances as follows, when measured in accordance with ACI 301 and ACI 117, including those floors to receive subsequent finishes.
  1. Interior Slabs in equipment areas: Class B 1/4 inch in 10 feet.

2. Interior Areas Indicated for Slopes and Pitches To Drain: Class B 1/4 inch in 10 feet.
3. Exterior Areas Indicated for Slopes and Pitches To Drain: Class B 1/4 inch in 10 feet.
4. Dried slabs shall not show curling at the corners of more than 1/8 inch when measured by a 2-foot straight edge placed in any direction.

### **3.11 CURING**

- A. General:
1. Protect all freshly placed concrete from premature drying. Maintain curing procedures used for three days, at temperatures above 70 degrees F. If mean daily temperature drops below 70 degrees F. during this period, extend curing period appropriately to 5 days.
  2. Field application of curing compound shall be 2 coats, one as soon as finishing is complete and the second the next morning in accordance with recommendations of the product manufacturer, but not at a rate in excess of 300 sq. ft per gallon.
  3. Protect all concrete during curing period from all damaging, mechanical disturbances, load stresses, heavy shock and excessive vibration.
  4. Protect finish surfaces from all damage.
  5. Leave curing compound on slab for a minimum of 7 days.
  6. If curing compound later requires removal within 3 weeks of application, strip following the procedures recommended by manufacturer, for all slab areas that require coatings or tile.

### **3.12 PATCHING AND REPAIRS**

- A. General: Defective concrete and honeycombed areas as determined by Engineer shall be repaired as specified in Section 03700.
- B. Upon removal of forms, remove plugs and break off metal ties. Where form ties are to be filled promptly fill holes upon stripping as follows:
1. Moisten holes with water, brush on a coat 1/16 inch of neat cement slurry mixed to consistency of paste. Plug hole with a 1 to 1.5 mixture of cement and concrete sand, mixed to a slightly damp to the touch consistency. Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form. Trowel smooth with heavy pressure and avoid burnishing.

### **3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION**

- A. General: The Owner shall employ a testing laboratory to perform tests and submit test reports. Testing lab shall furnish all equipment for taking and testing concrete samples. Sampling and testing of concrete shall be performed by ACI certified Concrete Field Technicians Grade 1.
- B. Sampling Fresh Concrete: Shall conform to ASTM C 172 and ASTM C 94 except as modified here.
1. Slump: ASTM C 143. One test at point of discharge for each class of concrete during the days placement, and one every additional 50 yards of each class of concrete. Additional tests should be taken if consistency of concrete changes.

2. Concrete and Ambient Temperature: Performed each time concrete compressive strength cylinders are cast per ASTM C-1064.
3. Compressive Test Specimens: ASTM C 31. One set of 5 cylinders for each compressive strength test taken at same frequency as slump test. Do not store cylinders in the field over 24 hours until picked up and then placed into laboratory curing conditions.
4. Compressive Strength Tests: ASTM C 39. Test one specimen at 3 days, test one specimen at 7 days, 2 cylinders at 28 days and hold one specimen for 56 days if the average of the 2 28-day cylinders strength is less than required compressive strength.
5. Test results will be reported in writing to Architect, Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests are completed. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design strength at 28 days, compressive strength, type of break, ambient and concrete temperature.
6. Additional tests: The testing lab will make additional tests of in-place concrete when test results indicate specified compressive strength and other characteristics have not been attained. Engineer will direct location and type of testing to be conducted. Costs of testing to be paid by contractor. Strength evaluations of structure and testing of in place concrete shall be per ACI 318.

### **3.14 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

- A. Formwork: Reuse forms without damaging structural integrity of concrete and without damaging aesthetics of exposed concrete.
- B. Mixing Equipment: Return excess concrete to supplier; minimize water used to wash equipment.
- C. Hardened, Cured Waste Concrete: Hardened, cured waste concrete may be crushed and reused as fill or as a base course for pavement.

**END OF SECTION**

## SECTION 03305

### CAST-IN-PLACE CONCRETE AND REINFORCEMENT

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Cast-in-place concrete.
- B. Concrete Formwork.
- C. Concrete Reinforcing.
- D. Concrete Curing.
- E. Concrete Finishing.

##### 1.2 RELATED SECTIONS

- A. Section 09310-Ceramic Tile.

##### 1.3 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. ACI 301-Structural Concrete for Buildings.
  - 2. ACI 304-Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
  - 3. ACI 305R-Hot Weather Concreting.
  - 4. ACI 308-Standard Practice for Curing Concrete.
  - 5. ACI 318-Building Code Requirements for Reinforced Concrete.
  - 6. ACI 347-Recommended Practice for Concrete Formwork.
  - 7. ACI SP-4-Formwork for Concrete.
  - 8. ACI 315-Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- B. American Plywood Association:
  - 1. Plywood: Properties, Design, and Construction.
  - 2. V345, Plywood for Concrete Forming.
- C. ASTM International:
  - 1. ASTM A615-Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 2. ASTM C33-Concrete Aggregates.
  - 3. ASTM C94-Ready-Mixed Concrete.
  - 4. ASTM C150-Portland cement.
- D. Concrete Reinforcing Steel Institute (CRSI):
  - 1. Manual of Standard Practice.
  - 2. CRSI P1, Placing Reinforcing Bars.



3. Florida Building Code.

- E. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

**1.4 SUBMITTALS**

- A. Product Data: Submit product data for all concrete materials, accessories, and admixtures proposed for use including the following information:

1. Recycled Content:

- (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
- (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
- (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

2. Regional Materials:

- (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
- (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
- (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

**1.5 TESTS**

- A. Testing and analysis of concrete of submitted for approval will be performed by an independent laboratory approved by Project Consultant. Costs of such tests will be borne by Contractor. Typical field-testing: by an independent laboratory approved by the Project Consultant and paid for by the Owner.
- B. Submit proposed mix design for each class of concrete to Architect for review prior to commencement of work. Indicate cement brand and type, aggregate gradation and source, and admixture brands, and proposed location/use of each mix design. Provide recent test data in accordance to ACI 318, Chapter 5.
- C. One set of 5 cylinders will be made for every 50 cubic yards, or fraction thereof placed per day. Test one cylinder at 3 days, 1 at 7 days, 2 at 28 days, and 1 retained for later testing in case the 28-day test fails to meet the specified strength requirements.

- D. One slump test will be taken, at point of discharge; for each set of test cylinders taken and whenever consistency of concrete appears to vary.
- E. Tests required by changes requested by Contractor or extra testing required by failure to meet specification requirements will be at Contractor's expense.
- F. Rejected Materials: In the event that tests on cylinders disclose a failure to develop the ultimate strengths required, the Project Consultant may order concrete cores to be made on portion of structure affected to determine the adequacy of such portions to sustain the loads for which its members were designed.
  - 1. Swiss Hammer, Windsor probe, Ultrasound and other similar tests may only be preliminary tests used to isolate deficient areas of concrete.
  - 2. Concrete cores sampled per ASTM C42 tested 0per ASTM C39 will be taken at location of lowest strengths as shown be the preliminary testing.
  - 3. In the event such tests indicate failure of any member to support the designed load, including the factor of safety, costs of changes, modifications, or replacements made necessary by failure, as directed by Project Consultant, will be paid by Contractor.

## **1.6 QUALITY ASSURANCE**

- A. Perform Work under provisions of ACI 301 and in accordance with FBC 2004.
- B. Perform concrete reinforcement under provisions of CRSI Manual of Standard Practice and Document P1.
- C. Conform to ACI 305R when concreting during hot weather.

## **1.7 PROJECT RECORD DOCUMENTS**

- A. Submit under provisions of Section 01780, "Closeout Submittals".
- B. Accurately record actual locations of embedded utilities and components, which are concealed from view.

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MATERIALS**

- A. All concrete materials shall contain recycled content such as fly ash, granulated ground blast-furnace slag, and normal weight aggregates
- B. Cement: ASTM C150, Type I or Type II-Normal, gray color.
- C. Supplemental Cement Materials:
  - 1. Fly Ash: ASTM C618, Type F. Not to exceed 20 percent by weight of total cementitious material.

2. Granulated Ground Blast-furnace Slag: ASTM C989. Not to exceed 30 percent by weight of cementitious material.
- D. Fine and Coarse Aggregates: ASTM C33.
  - E. Water: Clean and not detrimental to concrete. Potable.
  - F. Fibrous concrete reinforcement: Shall meet ASTM C-1116 Type III 4.1.3 and ASTM C-1116. Shall be 100 percent virgin polypropylene fibrillated fibers containing no reprocessed olefin materials and specifically manufactured for use as concrete reinforcement at a minimum of 0.1% by volume for the control of cracking due to plastic shrinkage and thermal expansion/contraction.

## **2.2 FORMWORK MATERIALS**

- A. Plywood: Douglas Fir species, medium density overlaid one side grade; sound, undamaged sheets with straight edges.
- B. Lumber: Southern Yellow Pine species; No. 2 grade with grade stamp clearly visible.
- C. Formwork Accessories:
  1. Form Ties: Snap-off metal of fixed length; cone type; 1 inch break back dimension; free of defects that will leave holes no larger than 1 inch in diameter in concrete surface.
  2. Form Release Agent: Colorless material, which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
    - (a) Synthetic resin for forms other than steel:
    - (b) A.C. Horn, Inc. "Formshield".
    - (c) Burke "Release".
    - (d) Symons "Magic Kote".
    - (e) Lambert Corp. "Form Release-80".
  3. Nails, Spikes, Lag Bolts, Through bolts, Anchorage's: Sized as required; of strength and character to maintain formwork in place while placing concrete.

## **2.3 REINFORCEMENT MATERIALS**

- A. All reinforcing steel materials are to contain recycled content.
- B. Reinforcing Steel:
  1. ASTM A615, 60 KSI yield grade billet-steel deformed bars, uncoated finish.
  2. A185 Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement. Flat Sheets.
- C. Accessory Materials:
  1. Tie Wire: Minimum 16 gage annealed type. Use form ties with one-inch snapback for exposed concrete surface.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation. Plastic coated feet where feet rest on exposed surface.

## **2.4 CONCRETE ACCESSORIES:**

1. Vapor Barrier: Ten mil thick clear polyethylene film, type recommended for below grade application.
2. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 6,000 psi in 28 days.
3. Liquid Membrane-Forming Curing Compound: Shall be a membrane-forming curing compound complying with ASTM C 309, Type I, except that minimum solid content shall be 30 percent and moisture loss shall not exceed 0.040 gm/cm<sup>2</sup> of surface in 72 hours at a coverage rate of 2 coats at three hundred (300) sq. ft per gallon.
  - (a) MasterKure 200WB by Master Builders.
  - (b) Super Aqua-Cure VOX by Euclid Chemical Co.
  - (c) Kure-N-Seal 30 by Sonneborn (BASF).

## **2.5 CONCRETE MIX**

- A. Mix and deliver concrete under provisions of ASTM C94.
- B. Provide concrete to the following criteria:
  1. Compressive Strength: 3000 psi in 28 days, maximum water / cement ratio of 0.6. Admixture for water reduction optional, subject to prior approval from Project Consultant. Unless otherwise noted on the drawings.
  2. Slump:
    - (a) 4 inches, with 1 inch plus or minus tolerance.
    - (b) Exceptions:
    - (c) Maximum slump of all concrete containing midrange water-reducing admixture shall be 7-1/2 inch.
    - (d) Job Tempering: Place all concrete within 1 1/2 hours after introduction of water to the mix. Submit the stamped batching tickets upon delivery of concrete to job site.
- C. Fiber Reinforcement: Concrete for slabs-on-grade shall contain the specified fiber reinforcement at a dosage of 1.5 pounds per cubic yard, or higher as required by the manufacturer for the specific application.
- D. Use of aggregate smaller than #67 is prohibited in foundations, slabs, tilt up walls, and grade beams/pile caps, without prior approval from Architect.
- E. Use set retarding admixtures during hot weather only when approved by Architect. Retarder shall conform to ASTM C494 Type D.
  1. MasterSet R 961 Master Builders.
  2. WRDA 60 by GCP Applied Technologies.
  3. Eucon WR by Euclid Chemical Company.

- F. Mid range Water Reducing admixture (if used) shall conform to ASTM C494 Type A.
  - 1. MasterPolyheed 997 by Master Builders
  - 2. Mira 110 by GCP Applied Technologies.
  - 3. Eucon MR by Euclid Chemical Company

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify site conditions, lines, levels, and measurements.

### **3.2 FORMWORK PREPARATION**

- A. Earth forms not permitted. All work shall be wood formed.
  - 1. Exceptions:
    - (a) Foundations monolithic with slabs, unless edge will remain exposed.
    - (b) Shaft type foundations for poles and similar structures provided soil is found to hold the design shape.

- B. Minimize form joints. Symmetrically align form joints.

- C. Arrange and assemble formwork to permit stripping, so that concrete is not damaged during form removal.

### **3.3 FORM CONSTRUCTION**

- A. General: Construct formwork as required to obtain the exact size, shape, dimensions, line, level, alignment, location, elevation, and grades as in indicated in the drawings. Construct forms to prevent loss of cement paste.

### **3.4 REINFORCEMENT INSTALLATION**

- A. Before placing concrete, clean reinforcement of loose rust, mill scale, earth, and other materials, which reduce or destroy bond with concrete.

- B. Place, support, and secure reinforcement and embeds against displacement. Do not deviate from alignment or measurement.

- C. Splice reinforcement by lapping ends, placing bars in contact, and tightly wire tying. Provide minimum lap for bars designated as continuous.

- D. Provide diagonal bar reinforcing at all re-entrant corners.

- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh plus 2 inches and wire splices. Offset end laps in adjacent widths to prevent continuous laps in either direction.

- F. Place reinforcement to obtain at least the minimum coverages for concrete protection.

### **3.5 CONCRETE PLACEMENT PREPARATION**

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- C. Coordinate the placement of all embedded items including electrical components, accessories, mounting hardware, etc.

### **3.6 PLACING CONCRETE**

- A. Place concrete under provisions of ACI 301.
- B. Notify Project Consultant and Inspection Personnel minimum 24 hours prior to commencement of operations.
- C. Do not install concrete after 90 minutes of the introduction of water.
- D. Ensure reinforcement, inserts, embedded parts, formed joint fillers not disturbed during concrete placement.
- E. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- F. Place concrete continuously between predetermined expansion and control joints or in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause a formation of plane of weakness within the section. Do not break or interrupt successive pours such that cold joints occur without permission of Project Consultant.
- G. Spade, rod, or vibrate to assure close contact with all surfaces of forms and reinforcement.
- H. Use elephant trunks or other approved devices for placing where the free drop would exceed 8 feet.
- I. Saw cut control joints within 8 hours after placing. Using 3/16-inch-thick blade, cut into 1/4 depth of slab thickness, but not less than is shown on the documents.

### **3.7 CONCRETE FINISHING**

- A. Provide formed concrete surfaces to be left exposed with smooth steel troweled finish.
- B. Provide slabs finishes with broom finish.
- C. Variation from level: Not more than 1/4 inch in 10 feet.
  - 1. Pitch to drain: As shown on drawings.

### **3.8 CURING AND PROTECTION**

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

### **3.9 FORM REMOVAL**

- A. Formwork not supporting the weight of concrete may be removed after 24 hours. Initiate and maintain curing and protection operations immediately after stripping forms.
- B. Formwork supporting the weight of concrete, do not remove until after fourteen (14) days (minimum) and concrete having a minimum of 90 percent of the required 28-day compression strength.
- C. Do not damage concrete during formwork removal.

### **3.10 PATCHING**

- A. Allow Project Consultant to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
- C. Repair surface defects including tie holes, immediately after removal of forms, under provisions of ACI 301, Chapter 5.

### **3.11 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of the Architect for each individual area.

### **3.12 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

- A. Formwork: Reuse forms without damaging structural integrity of concrete and without damaging aesthetics of exposed concrete.
- B. Mixing Equipment: Return excess concrete to supplier; minimize water used to wash equipment.

- C. **Hardened Cured Waste Concrete:** May be crushed and reused as fill or as a base course for pavement.

**END OF SECTION**



**SECTION 03700**  
**CONCRETE REPAIR**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes Furnishing of materials, labor, tools, and equipment necessary to repair and restore poorly placed, deteriorated or rejected concrete. This includes removal, surface preparation and installation of repair materials of deteriorated areas and cracks as indicated on the drawings and specified herein.
- B. Install shoring as directed or as needed to perform the Work.

**1.2 COORDINATION**

- A. Coordinate scheduling, submittals, and Work of various sections of the specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Coordinate dumpster location, staging and storage requirements with the Owner.

**1.3 EXAMINATION**

- A. Verify that existing site conditions are acceptable to commence Work. Verify existing dimensions and construction details. Installation of any products on the surface or substrate shall constitute full acceptance of the condition of the substrate or surface as sound and appropriate to receive the Contractor's Work.
- B. Verify that utility services are available, of the correct characteristics and in the correct location.

**1.4 REFERENCES**

- A. Referenced Codes and Standards: Comply with the most recent publications of the following codes, specifications, and standards.
  - 1. ACI 301-Standard Specification for Structural Concrete.
  - 2. ACI 308-Guide for Consolidation of Concrete.
  - 3. ACI 318-Building Code Requirements for Reinforced Concrete.
  - 4. ACI 546R-Concrete Repair Guide.
  - 5. ASTM C33-Standard Specification for Concrete Aggregates.
  - 6. ASTM C94-Standard Specification for Ready-Mixed Concrete.
  - 7. ASTM C150-Standard Specification for Portland Cement.
  - 8. ASTM C260-Standard Specification for Air-Entraining Admixtures for Concrete.
  - 9. ASTM C309-Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - 10. ASTM C469-Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.
  - 11. ASTM C494-Standard Specification for Chemical Admixtures for Concrete.
  - 12. ASTM A 615-Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete.

13. ASTM C881-Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
14. ASTM C1042-Standard Test Method for Bond Strength of Latex Systems Used With Concrete.
15. "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion" (Guideline No. 03730) International Concrete Repair Institute. 1995 copyright.
16. "Guide for Selecting Application Methods for Repair of Concrete Surfaces" (Guideline No. 03731) International Concrete Repair Institute. 1996 copyright.

**1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01300. Include copy of manufacturer's product installation instruction and data sheet.
- B. Approval by Engineer is required before beginning Work affected by submittals.

**1.6 QUALITY ASSURANCE**

- A. Comply with Manufacturers' instructions related to mixing and placing of the materials.
- B. Protection of Work: Protect installed work and prohibit traffic or storage upon waterproofed or coated surfaces.

**1.7 DELIVERY, STORAGE and HANDLING**

- A. Delivery products in original unopened containers with the manufacturer's name, labels, product identification and batch number.
- B. Store and condition the specified products as recommended by the manufacturer. Products shall remain unopened until ready for use.
- C. Where mixing of components is required, use complete pre-measured units.

**PART 2 PRODUCTS**

**2.1 PATCHING REPAIR MATERIALS**

- A. Subject to compliance with other requirements in this specification, provide the following materials or equivalent materials approved by engineer that meets the performance requirements stated below.
- B. Structural Repair Mortar: Provide single component shrinkage-compensated, silica fume modified, cement-based mortar containing corrosion inhibitor for structural repair of distressed horizontal, vertical or overhead concrete. Structural Repair Mortar shall have a minimum modulus of elasticity of  $3.80 \times 10^6$  psi.
  1. MaterEmaco S 488 CI by Master Builders (BASF).
- C. Surface Repair Mortar: Provide single component polymer-modified cementitious repair mortar containing corrosion inhibitor for resurfacing of distressed horizontal, vertical or overhead concrete. Surface Repair Mortar shall have a maximum modulus of elasticity of  $2.50 \times 10^6$  psi.
  1. MasterEmaco N CI series by Master Builders (BASF).
- D. Rapid Hardening and High Early Strength Repair Mortar: Provide a high early strength, single component mortar for applications requiring rapid return to service.

1. MaterEmaco T by Master Builders (BASF).
  2. Set 45 series by Master Builders (BASF, Requires special application methods).
- E. Walking Surface Repair Mortar: Provide single component polymer-modified cementitious repair mortar. Walking Surface Repair Mortar shall have a minimum modulus of elasticity of  $2.90 \times 10^6$  psi. Refer to manufacturer's recommendations for proper application methods, limitations and additional related materials:
1. MaterEmaco T 310 CI by Master Builders (BASF).
  2. SikaQuick 1000 by Sika Corporation.
  3. ARDEX ERM Exterior Ramp Mortar by ARDEX Engineered Cements.
- F. Aggregate: Shall conform to ASTM C 33. Aggregate for incorporation with bagged mortar shall be 3/8 inch, well graded non-reactive and cleaned.
- G. Water: Clean and potable.

## **2.2 RELATED MATERIALS**

- A. Epoxy Bonding Agent: Provide 100 percent solids, two-component epoxy bonding compound for bonding new concrete to existing surfaces. Epoxy bonding agent shall meet ASTM C 881, Type V, Grade B or C material.
1. MaterEmaco ADH RS series by Master Builders.
- B. Anti-Corrosion Reinforcing Bar Coating: Provide polymer-modified, cement-based coating with corrosion inhibiting admixture to provide protection for steel reinforcing.
1. MaterEmaco P124 by Master Builders.
- C. Evaporation Retarder: Provide a spray applied monomolecular film that reduces the rate of surface moisture evaporation under hot, dry or windy conditions.
1. MasterKure ER 50 by Master Builders.
- D. Liquid Membrane-Forming Curing Compound: Shall conform to ASTM C 309, Type I (minimum 30 percent solids) at a minimum application rate of 200 square feet per gallon.
1. MasterKure 100WB by Master Builders.
- E. Epoxy Adhesive: Provide a two component 100 percent solids moisture insensitive, low viscosity epoxy resin meeting ASTM C 881-90, Type IV, Grade 1, Class B or C.
1. MaterEmaco ADH RS by Master Builders.
- F. Surface Seal: The surface seal material for epoxy injection is that material used to confine the injection adhesive in the fissure during injection. This material shall have sufficient strength to resist injection pressures to prevent leakage during injection.

## **2.3 REINFORCEMENT MATERIALS**

- A. Reinforcing steel: Conforming to ASTM A 615, 60 ksi yield grade billet-steel deformed bars.
- B. Stirrup Steel: Conforming to ASTM A 615, 40-ksi-yield grade billet-steel deformed bars.

## **2.4 ALTERNATE TRANSIT MIXES**

- A. General: Alternate transit mixes may be considered for selective large concrete replacement applications.

- B. Contractor shall submit mix design and supporting back-up data for proposed transit mix to Engineer prior to use. One of the three design methods referenced in ACI 318-95 must be used.
- C. Concrete mixes to be produced and delivered conforming to ASTM C 94.

## **PART 3 EXECUTION**

### **3.1 SURFACE PREPARATION**

- A. All repair areas shall be prepared in accordance with International Concrete Repair Institute's "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion" (Guideline No. 03730). This includes but is not limited to the following.
  1. Remove loose or deteriorated concrete above reinforcing steel. Removals shall be performed with chipping hammers or other approved method. Chipping hammers shall not be in excess of 15-pound rating.
  2. Once removals are made, proceed with undercutting of all exposed reinforcing bars. Undercutting will provide clearance for under the bar cleaning. Concrete shall be removed such that a minimum 3/4-inch clearance under the bar is achieved, and 1/4 inch greater than the largest aggregate used in the repair material.
  3. Concrete removals shall extend along the bars to locations along the bar free of bond inhibiting material. Removals shall extend two inches beyond the location of corrosion-free bars.
  4. If non-corroded reinforcing bars are exposed during the undercutting, care will be taken not to damage the bond between the bar and the concrete.
  5. Loose reinforcement shall be secured in place by tying to other secured bars or by approved method.
  6. Engineer shall determine the necessity of replacing or supplementing reinforcing steel with reduced cross-sectional areas caused by corrosion damage or lacking adequate reinforcing steel.
  7. Repair configurations should be kept as simple as possible to minimize boundary edges.
  8. At edge locations, provide right angle cuts to the concrete surface by saw-cutting 3/4 inch or less as required to avoid cutting reinforcing steel.
  9. After removals and edge conditioning are complete, remove bond-inhibiting materials by abrasive blasting or high-pressure water blasting. Check concrete surfaces after cleaning to ensure that the surface is free from loose aggregates. Resound prepared area and areas immediately around the prepared area to ensure all delaminated concrete has been removed.
  10. Presoak repair substrate to a saturated surface dry condition.
- B. Bar Coating and Bonding Options
  1. Following completion of repair preparation, apply anti-corrosion reinforcing bar coating to the exposed reinforcing steel.
  2. Bond the repair material to the prepared area with one of the following methods.

- (a) Apply the epoxy-bonding agent to the prepared concrete surface according to manufacturer's instructions.
- (b) Apply a slurry bond coat of the repair material to the prepared area with a stiff bristle brush or broom. Do not allow the slurry to dry prior to installation of the repair material. Do not retemper this bond coat.

### **3.2 MIXING**

- A. Mechanical mixing is recommended with the use of a slow speed drill and a jiffler type paddle, or in an appropriate mortar mixer. Typical mixing time is 3-5 minutes. Do not add more water than is recommended by the manufacturer. Do not mix longer than 5 minutes.
- B. Only that portion of material that can be properly mixed within 10 minutes of application should be mixed.

### **3.3 APPLICATION**

- A. Apply fresh mortar to the bond coat. Place repair mortar according to manufacturer's recommendations.
- B. Evaporation Retarder: Where rapid surface evaporation may occur, in hot, windy conditions, apply specified evaporation retarder according to manufacturer's recommendations.
- C. Finishing: Completed repair surfaces should be straight, true and match existing profiles and surface texture. Do not overwork the surface.
- D. After application is completed and repair material has sufficiently set so resounding will not damage it, resound patched area to insure proper bonding of the repair material.

### **3.4 CURING**

- A. All repaired surfaces must be cured for a minimum of 5 days with one of the following methods.
  - 1. Wet cure with burlap or wet burlap.
  - 2. Ponding.
  - 3. Sheeting material.
  - 4. Liquid membrane-forming curing compound. Apply per manufacturer's recommendations.
- B. Protect cured areas from storage and traffic during curing period.

### **3.5 CRACK REPAIR**

- A. Epoxy Injection
  - 1. Preparation: Prepare the area and cracks to be injected in the following manner.
    - (a) Surfaces adjacent to cracks or other areas of application shall be cleaned of dirt, dust, oil, and grease or other foreign matter which may be detrimental to bond of injection surface seal.
    - (b) Entry ports shall be provided along the crack at intervals of not less than the thickness of concrete at that location.
    - (c) Surface seal material shall be applied to the face of the crack between the entry ports. Allow surface seal material to gain strength prior to injection.
  - 2. Equipment for Injection: Provide injection equipment that is portable, positive displacement type pump. The pump shall be electric, or air

powered and shall provide in-line metering and mixing. Equipment shall have the capability of maintaining the volume ratio for the epoxy adhesive within a tolerance of +/- 5 percent by volume at any discharge pressure up to 160 psi.

3. Injection: Shall begin at the lowest entry port and continue until there is an appearance of epoxy adhesive at the next port adjacent to the entry port being pumped. The epoxy injection shall be transferred to the next adjacent port where the adhesive has appeared. Injection shall be performed until cracks are completely filled.
  4. Finishing: When cracks are completely filled, epoxy adhesive shall be cured for sufficient time to allow removal of surface seal without any draining or run-back of epoxy adhesive material. Surface seal material and any adhesive runs shall be removed from concrete surfaces. The face of the crack shall be finished flush with concrete, showing no indentations or protrusions caused by placement of entry ports.
  5. Filling Cored Holes: After the Work has been accepted by the Architect, cored holes shall be repaired using a two component-bonding agent and a suitable repair mortar. The bonding agent shall be applied to the surfaces of the cored holes, followed by application of repair mortar placed by hand trowel, thoroughly rodded and tamped in place, and finished to match color, finish, and texture of existing concrete.
- B. Crack Sealing by Gravity
1. Repair Method: Notch cut cracks to 20 mils to 1.4-inch wider cracks with a mechanical router. Remove all loose debris and dust. Clean out cracks and voids by compressed air or as recommended by manufacturer. If appropriate, seal underside of the crack with a surface seal. Pour neat (no sand) low viscosity material in routed crack until it is completely filled. Allow to seep into the crack and refill. Finish material off flush with concrete so as not to show any indentations or protrusions.

### **3.6 CLEANING**

- A. General: Keep area clean during repair operation, remove and clean promptly, mortar, or epoxy spills with appropriate tools and solvents without damaging concrete. Collect and maintain site in a clean and orderly condition. Remove debris daily from site.
- B. Final Cleaning: Remove all mortar splatters, epoxy spills from the repair area and adjacent structures acceptable to the Engineer.

**END OF SECTION**

## **SECTION 04200**

### **UNIT MASONRY**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Concrete masonry units, associated components, and accessories.

##### **1.2 RELATED SECTIONS**

1. 01572-Construction Waste Management
2. 03300-Cast-In-Place Concrete.
3. 08100-Steel Doors and Frames.
4. 09200-Metal Studs, Lath, Suspension Ceiling, Plaster, and Stucco.
5. Furnishing of other items to be built-in under respective sections.

##### **1.3 REFERENCES**

- A. American Concrete Institute (ACI):
  1. ACI 530/530.1-Building Code Requirements and Specifications for Masonry Structures.
  2. ASCE 37-02-Design loads on structures during construction.
- B. ASTM International (ASTM):
  1. A82 Specification for Steel Wire, Plain, for Concrete Reinforcement.
  2. A153 Specifications for zinc coating (hot-dip) on iron and steel hardware
  3. C55 Specification for Concrete Brick.
  4. C90 Specification for Load bearing Concrete Masonry Units.
  5. C91 Specification for Masonry Cement.
  6. C129 Specification for Non-Load bearing Concrete Masonry Units.
  7. C144 Specification for Aggregate for Masonry Mortar.
  8. C150 Specification for Portland Cement.
  9. C270 Specification for Mortar for Unit Masonry.
  10. C331 Specification for Lightweight Aggregates for Concrete Masonry Units.
- C. Florida Building Code.
- D. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

##### **1.4 SUBMITTALS**

- A. Submit properly identified product data on masonry units and each type of metal anchor and accessory, before starting work, which shall certify conformance to these specifications.
  1. Submittal is for information only. Neither receipt of list nor acceptance of mockup constitutes approval of deviations from Contract Documents unless such deviations are specifically brought to the attention of the Architect and approved in writing.

- B. Product Data: Submit product data for all concrete materials, accessories, and admixtures proposed for use including the following information:
1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  2. Regional Materials:
    - (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
    - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
    - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
    - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

## 1.5 QUALITY ASSURANCE

1. Refer to ACI 530/530.1 and FBC for inspection requirements. Note that for all masonry bearing walls, a 'special inspector' is required.
2. Certifications: Provide certification from concrete unit masonry manufacturer stating the materials supplied meet specifications.
  - (a) Provide a certification for fire rating for each masonry unit type submittal.
  - (b) Submit compressive strength and absorption tests demonstrating compliance with specifications.
  - (c) Test reports shall be no older than one year and be representative of the batch characteristics of the proposed masonry unit(s).
3. Mason Certification:
  - (a) Perform under the direct supervision of a "Certified Structural Masonry Contractor".
  - (b) The supervisor of the masonry portion of the project: "Certified Structural Masonry Contractor and a Certified Structural Mason" as recognized by the Florida Concrete & Products Association (FC&PA).
  - (c) The Masonry Supervisor: Responsible to assure that the work is accomplished under provisions of the contract documents.
  - (d) The Masonry Contractor: Submit credentials from the FC&PA to the Architect for review and approval prior to bidding.
  - (e) All Masonry Work: Under the direct, onsite supervision of a certified structural mason.
4. Mock-Ups: Erect, at a minimum or as otherwise directed by A/E for size or quantity, a 6 foot long by 4 foot high by full thickness sample wall panel to represent completed exterior and interior masonry work for each type of



masonry for qualities of appearance, materials, and construction. Retain sample wall in an undisturbed condition during construction for standard judging for completed masonry work.

5. Testing Agency Qualifications: Conform to ASTM C10 83
6. Pre-construction testing: Perform the following pre-construction testing to establish compliance of proposed materials and construction with specified requirements:
  - (a) Prism Test: For each type of wall construction indicated, test masonry prisms per ASTM E447, Method B.
  - (b) Evaluate Mortar composition and properties per ASTM C780.
  - (c) Test grout compressive strength per ASTM C109.
  - (d) Provide additional testing as required in section 3.6.
7. Fire-Resistant Ratings: Provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E119.
8. Single-source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from 1 source and by a single manufacturer for each different product required.
9. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from 1 manufacture for each cementitious component and from 1 source or producer for each aggregate.
10. Delivery, Storage, And Handling
  - (a) Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes.
  - (b) Store cementitious materials on elevated platforms, under cover, and in a dry location.
  - (c) Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
  - (d) Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
11. Project Conditions:
  - (a) Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
    - (1) Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
    - (2) Where 1 wythe of multi-wythe masonry walls is completed in advance of the wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
  - (b) Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
  - (c) Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

- (1) Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
- (2) Protect sills, ledges, and projections from mortar droppings.
- (3) Protect surfaces of window and doorframes, as well as similar products with painted and integral finishes, from mortar droppings.
- (4) Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

## **1.6 PROJECT CONDITIONS**

1. Environmental Conditions
  - (a) Temperature: 40 degrees F. minimum and rising.
  - (b) Weather: No application during precipitation.
2. Special Requirements
  - (a) Comply with the following requirements:
    - (1) Cover masonry with a weather-resistant membrane for 48 hours after construction.
    - (2) Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 degrees Fahrenheit and above.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. All concrete masonry units, brick, and steel reinforcement, anchors, ties, and accessories to contain recycled content and regional materials.

### **2.2 LOAD BEARING UNIT MASONRY**

- A. Weight: Normal.
- B. Size: 8 inches x 16 inches x thickness indicated,
  1. Two cell flush end type.
  2. Two cell stretcher type one end (to be used adjacent to concrete construction)
- C. Texture: Medium.
- D. Grade: ASTM C90, Type II.
- E. Shapes: Appropriate to suit conditions.
  - (a) Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions including partition top closures.
  - (b) Provide bullnose units for outside corners, unless otherwise indicated.

## **2.3 NON-LOAD BEARING CONCRETE UNIT MASONRY**

- A. Weight: Normal.
- B. Size: 8 inches x 16 inches x thickness indicated
  - 1. 2 cell flush end type.
  - 2. 2 cell stretcher type one end (to be used adjacent to concrete construction)
- C. Texture: Medium.
- D. Grade: ASTM C129, Type II.
- E. Shapes: Appropriate to suit conditions.
  - (a) Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions including partition top closures.
  - (b) Provide bullnose units for outside corners, unless otherwise indicated.

## **2.4 MORTAR AND GROUT MATERIALS**

- A. Portland Cement: ASTM C150, Type I, domestic.
- B. Masonry Cement: ASTM C91.
  - 1. For pigmented mortars, use premixed, colored mortar cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations.
  - 2. Pigments: Do not exceed 5 percent of mortar cement by weight for mineral oxides nor 1 percent for carbon black.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C150, Type I or Type III, and hydrated lime complying with ASTM C207.
  - 1. For pigmented mortars, use premixed, colored mortar cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments: do not exceed 10 percent of mortar cement by weight for mineral oxides nor 5 percent for carbon black.
- E. Aggregate for Grout: ASTM C404.
- F. Mortar Pigments Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.
- G. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Colored Masonry Cement:
    - (a) Brixment-in Color; as manufactured by Essrock Materials, Inc.
    - (b) Centurion Colorbond; as manufactured by Lafarge Corporation.
    - (c) Lehigh Custom Color Masonry Cement; as manufactured by Lehigh Portland Cement Company.

- (d) Flamingo Color Masonry Cement; as manufactured by Riverton Corporation.
- 2. Colored Portland Cement-Lime Mix:
  - (a) Color Mortar Blend; as manufactured by Glen-Gery Corporation.
  - (b) Centurion Colorbond; as manufactured by Lafarge Corporation.
  - (c) Lehigh Custom Color Masonry Cement; as manufactured by Lehigh Portland Cement Company.
  - (d) Riverton Portland Cement Lime Custom Color; as manufactured by Riverton Corporation.
- 3. Mortar Pigments:
  - (a) True Tone Mortar Colors; as manufactured by Davis Colors.
  - (b) Centurion Colorbond; as manufactured by Lafarge Corporation.
  - (c) SGS Mortar Colors; as manufactured by Solomon Grind-Chem Services, Inc.
- H. Sand: ASTM C144.
- I. Water: Potable.

## **2.5 MORTAR AND GROUT MIXES**

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: ASTM C270, Type S, 1800 psi use, and Type M-2500 psi. Mix accurately proportioned by volume.
- C. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout of consistency indicated or, if not otherwise indicate, of consistency (fine or coarse) at time of placement that will completely fill spaces intended to receive grout.
  - 2. Use fine grout in grout spaces less than 2 inches in horizontal dimension, unless otherwise indicated.
  - 3. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, unless otherwise indicated.
  - 4. Slump for grout shall be between 8 inch and 11 inch.
  - 5. See also requirements in Section 03300.
- D. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's directions.

## **2.6 REINFORCEMENT, ANCHORS, TIES, AND ACCESSORIES**

- A. Horizontal Joint Reinforcement: Continuous 9 gage truss (see below) design, deformed, galvanized steel.
  - 1. Acceptable manufacturers:
    - (a) A.A. Wire Products.
    - (b) Dur-O-Wal.
    - (c) Hohmann and Barnard, Inc.
  - 2. Galvanized to meet ASTM A-153, Class B-2.
  - 3. Provide ladder type for reinforced walls, truss type for non-reinforced walls.

4. Provide prefabricated corners and tees for use at wall intersections.
  5. Widths to suit thickness of block to within 1 inch of each face.
- B. Buck Anchors: 16 gage corrugated galvanized steel, 1-1/4 inch wide, 8 inch long leg, with 2 inch upturned end, punched for fastenings, complete with No.10 galvanized machine screws and metal expansion anchors for securement to concrete.
- C. Dovetail Slots: 22 gage galvanized with filler, 1 inch wide x 1 inch deep.
- D. Dovetail Anchors: 16 gage corrugated galvanized steel, 1 inch wide x 5-1/2 inch long, sized to fit dovetail slots.
- E. Embedded Flashing Materials:
1. Concealed Through-Wall Flashing: Manufacturers full sheet of copper, 7 ounces per square foot, laminated between and bonded to two 2 layers of asphalt impregnated fiberglass fabric.
  2. Adhesive Backed Membrane Flashing: Manufacturer's standard composite flashing product consisting of pliable and highly adhesive rubberized asphalt compound, 32 mils thick, bonded completely and integral to a high-density, cross laminated polyethylene film, 8 mils thick to produce an overall thickness of 40 mils.
    - (a) Primer: Flashing manufacturer's standard product or product recommended by flashing manufacturer for bonding flashing sheets to masonry and concrete.
  3. Solder and Sealants for Sheet-Metal Flashings: As specified in Division 7 Section "Flashing and Sheet Metal".
  4. Products: Subject to compliance with requirements, provide one of the following:
    - (a) Concealed Through-Wall Flashing:
      - (1) FCO Copper-Fabric Flashing: As manufactured by AFCO Products, Inc., Sommerville, Mass. 617-623-7700.
      - (2) H & B C-Fab Flashing: As manufactured by Hohmann & Barnard, Inc., Hauppauge, N.Y. 516-234-0600.
      - (3) Approved equivalent alternative.
- F. Miscellaneous Masonry Accessories:
1. Compressible Filler: Premolded filler strips complying with ASTM D1056, Type Class A, Grade 1; compressible up to 35 percent; of width and thickness indicated; formulated from the following material:
    - (a) Neoprene.
    - (b) Urethane.
    - (c) Polyvinyl chloride.
  2. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
    - (a) Styrene-Butadiene Rubber Compound: ASTM D2000, Designation M2AA-805.
    - (b) Weep Holes: Provide the following:
      - (1) Vinyl Weep Hole/Vent: One-piece, offset, T-shaped units formed to fit in a vertical mortar joint by injection molding of flexible polyvinyl chloride and consisting of a louvered

vertical leg, flexible wings to seal against ends of masonry units, and top flap; in color approved by Architect to match that of mortar.

3. Cavity Drainage Material: Two inch thick, reticulated, nonabsorbent mesh, made from polyethylene strands and shaped to maintain drainage at weep holes without being clogged by mortar droppings.
  - (a) Product: Subject to compliance with requirements, provide "Mortar Net" by Mortar Net USA, Ltd.
4. Approved equivalent alternative.

## **2.7 MASONRY CLEANERS:**

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.
  1. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface-acting acids chelating, and wetting agents.
  2. For dark-colored masonry not subject to metallic oxidation stains, use formulation consisting of a liquid blend of surface-acting and special inhibitors.
  3. For masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic and inorganic acids and special inhibitor.
- B. Products: Subject to compliance with requirements, provide one of the following:
  1. 202 New Masonry Detergent; Diedrich Technologies, Inc.
  2. 200 Lime Solv; Diedrich Technologies, Inc.
  3. 202V Vana-Stop; Diedrich Technologies, Inc.
  4. Sure Klean No. 600 Detergent; ProSoCo, Inc.
  5. Sure Klean No. 101 Lime Solvent; ProSoCo., Inc.
  6. Sure Klean Vana Trol; ProSoCo, Inc.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Examination:
  1. Verify that the surfaces, substrates and conditions are satisfactory to receive unit masonry, and are free from deviations affecting quality of the work.
  2. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.
    - (a) For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of unit masonry.
    - (b) Examine rough-in and built-in construction to verify actual locations of piping connections prior to Installation.

### **3.2 LOCATION OF MASONRY SYSTEMS (UON on drawings)**

- A. Load Bearing Units: For partitions and walls 8 inches or greater.
- B. Load Bearing Lightweight Units: For partitions and walls as indicated.
- C. Non-Load Bearing Units: For partitions 4 or 6 inches.
- D. Concrete Brick: Filling-in to suit conditions.
- E. Corners and Special Shapes: As required to suit conditions, including corners, returns, offsets, and to maintain bond.

### **3.3 LOCATION OF REINFORCEMENT, ANCHORS, TIES, AND ACCESSORIES**

- A. Horizontal Joint Reinforcement: Every second block course and at first joint above and below openings, for all masonry, interior or exterior.
- B. Buck Anchors: Every second block course for masonry walls and partitions abutting precast concrete and wherever dovetail anchors cannot be incorporated. Secure upturned ends to concrete with specified screws and anchors.
- C. Dovetail Anchors: Every second block course for masonry walls and partitions abutting cast-in-place concrete with continuous dovetail anchor slots.

### **3.4 ERECTION**

- A. General:
  1. Ensure scaffolds and loadings conform to requirements of ASCE 37-02.
  2. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.
  3. Build chases and recesses to accommodate items specified in this and other Sections of the Specifications.
  4. Leave openings for equipment to be installed before completion of masonry. After installing equipment, complete masonry to match construction immediately adjacent to the opening.
  5. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
  6. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- B. Laying Units:
  1. Lay masonry plumb, true to line, with level and accurately spaced courses.
  2. Keep bond plumb throughout.
  3. Lay corners and reveals plumb and true.
  4. Avoid over plumbing of corners and jambs to fit stretcher units after they are set in position.
  5. Where adjustment must be made after mortar has started to harden, remove mortar and replace with fresh mortar.
  6. Use concrete brick to course out walls concealed in the finished work.

7. Vertical cells to be grouted shall be aligned to provide unobstructed openings for grout.
  8. Stopping and Resuming Work: In each course, rack back one-half (1/2) unit length for one-half (1/2) running bond or one-third (1/3) unit length for one-third (1/3) running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar prior to laying fresh masonry.
- C. Tolerances:
1. Conform to tolerances listed in ACI530.1, Part 3.
- D. Bond:
1. Provide common bond, with vertical joints centered over masonry unit below, except where other bonds are indicated.
  2. Lap alternate masonry courses at corners and intersections.
- E. Joint Treatment:
1. Block Exposed to View: Tooled concave joints mortar thoroughly compacted and pressed against edges of units and float finish joints.
  2. Concealed Block: Joints struck flush.
  3. Joint Thickness: 3/8 inch.
- F. Jointing Methods:
1. Where block cores are indicated to be filled with grout, lay in full mortar beds and full mortar end joints.
  2. Lay all other concrete block with full beds of mortar on vertical and horizontal face shells.
  3. Furrowing of mortar not allowed.
  4. Shove vertical joints tight.
  5. Finish tooled joints to uniformly straight and true lines and surfaces, smooth and free of tool marks.
  6. Uniformly rake joints between masonry and doorframes to 3/8 inch depth to receive caulking or sealant.
  7. Rake joints around flush electrical outlets in wet locations to receive caulking or sealant.
  8. Remove masonry protrusions extending 1/2 inch or more into cells or cavities to be filled.
- G. Mortar Filled Units:
1. First cell of blocks abutting doorjambs and window frames.
  2. Cells of blocks at free ends of partitions and walls.
  3. Where necessary for embedment of anchors, and where otherwise shown.
  4. Voids around ducts, pipes, and other items passing through masonry work.
  5. Hollow metal door frames and elevator hoistway door frames in masonry walls and partitions:
    - (a) Grout solid with mortar as masonry is laid.
    - (b) Include tops of door frames.
    - (c) Load Bearing Masonry Walls:
      - (1) Erect masonry before reinforced concrete building frame.
      - (2) Close masonry top course cores under poured concrete beams with paper stuffing or metal caps.



(3) Do not use flush end type units against columns or poured concrete walls.

H. Non-Load Bearing Masonry Wall and Partition Anchorage:

1. Erect masonry after steel and concrete frames are in place, and after concrete floors and roof decks are in place.
2. After forms are stripped, remove slot fillers.
3. At edges of non-bearing interior masonry walls and partitions abutting concrete columns and poured concrete walls, provide corrugated dovetail type anchors.
4. Grout dovetail slots and space between end of masonry units and concrete solid.
5. Point up all joints solid and flush on both sides of partitions.

I. Partition Heights:

1. Partitions to be continuous from floor to underside of floor or roof construction above. UON drawings.
2. Full height partitions and walls to be wedged tight with tile or brick set in mortar.
3. Use brick or solid units for top masonry course. UON drawings.
4. Point up all joints solid and flush on both sides of walls and partitions.
5. Where suspended ceilings on both sides of partitions are indicated, the partitions other than those shown to be continuous may be terminated approximately four inches above the ceiling level, where noted on drawings.

J. Concrete Grout Fill for Masonry Cores:

1. Coordinate masonry work to allow placing of grout as indicated and as specified in this section.
2. Fill top courses of masonry walls with grout before placing or use concrete brick for top courses to assure solid masonry.

K. Pipe Chase Walls and Partitions: Erect after pipes are in place, tested, and accepted.

L. Slots, Chases, Recesses and Openings: Provide as required for work of other trades.

M. Setting of Items Furnished Under Other Sections: Set anchors, bolts, sleeves, access panels, doorframes, and other items occurring in masonry as the work proceeds.

N. Securing Hollow Metal Door Frames: Set in hollow metal frames on floor, floor clips secured and frames braced in proper position. Grout anchors into masonry joints as walls are erected.

O. Lintels: Set reinforced precast concrete or coordinate installation of cast-in-place concrete lintels as indicated.

1. Precast concrete lintels to be set in full mortar beds with 8 inches minimum bearing each end.
2. Cast-in-place lintels shall be used at openings, which have cast-in-place columns at either or both ends.
3. Lintels shall be appropriately sized for the opening and shall have openings cast into the unit each end to allow for the passage of vertical reinforcing.

- P. Flashing, Weep Holes, And Vents:
1. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
  2. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.
  3. Install flashing as follows:
    - (a) At composite masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches, and to the surface of the waterproofing membrane applied to the outer face of the inner wythe.
    - (b) At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn up not less than 2 inches to form a pan.
    - (c) Interlock end joints of sheet-metal flashing by overlapping ribs not less than 4 inches, and seal lap with elastomeric sealant complying with requirements of Section 07920-Joint Sealants for application indicated.
    - (d) Extend sheet-metal flashing 1/2 inch beyond face of masonry at exterior and turn down to form a drip.
  4. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
    - (a) Form weep holes with product specified.
    - (b) Space weep holes 24 inches on center.
    - (c) Place cavity drainage material immediately above flashing in cavities.
- Q. Installation of Horizontal Wall Reinforcement:
1. In masonry areas indicated to have concrete filled cores, provide reinforcement in every horizontal joint.
  2. At other areas, provide reinforcing in every second block course joint and at first joint above and below openings for exterior and interior masonry.
  3. Provide prefabricated corners and tees at all wall intersections.
  4. Extend reinforcement 6 inches into concrete tie columns and concrete encasement of steel columns poured after block is in place.
  5. Unless walls have cast-in-place concrete corner tie columns, make wall and partition joint reinforcing continuous around corners and at intersections according to manufacturer's published directions.
  6. Lap splices in joint reinforcement no less than 6 inches. Reinforcement shall not be continuous through expansion or control joints.
- R. Covers: At work stoppage, provide waterproof covers secured over exposed wall tops for weather protection.
- S. Pointing: Point holes in masonry. Cut out and point up defective joints.

### **3.5 MASONRY WASTE DISPOSAL:**

1. Recycling: Undamaged, excess masonry materials are Contractor's property and removed from the Project site for his use.
2. Disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - (a) Crush masonry waste to less than 4 inches in greatest dimension.
  - (b) Mix masonry waste with at least 2 parts specified fill material for each part masonry waste. Fill material is specified in Section 02300-Earthwork.
  - (c) Do not dispose of masonry waste as fill within 18 inches of finished grade.
3. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste and legally dispose of off Owner's property.

### **3.6 FIELD QUALITY CONTROL**

- A. The Owner will employ and pay a qualified independent testing agency to perform the following testing for field quality control. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 square feet of wall area or portion thereof.
- C. Mortar composition and properties will be evaluated per ASTM C780.
- D. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E447, Method B. and as follows:
  1. Test prior to construction.
  2. Test for every 5,000 sq/ft of wall area or portion thereof.
- E. Evaluation of Quality-Control Tests: In the absence of other indications of non-compliance with requirements, masonry will be considered satisfactory if results from construction quality-control tests comply with minimum requirements indicated.

**END OF SECTION**

**SECTION 04230**  
**REINFORCED UNIT MASONRY**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Concrete masonry units, reinforcements, associated components, and accessories.
- B. Related Sections:
  - 1. 01572-Construction Waste Management
  - 2. 03100-Concrete Formwork.
  - 3. 03200-Concrete Reinforcement.
  - 4. 03300-Cast-in-Place Concrete.
  - 5. 04200-Unit Masonry.

**1.2 REFERENCES**

- A. Comply with Reference requirements of Sections 03300 and 04200.
- B. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

**1.3 QUALITY ASSURANCE**

- A. Comply with provisions of applicable codes, specifications, and standards, except where more stringent requirements are shown or specified, as referred to in Sections 03300 and 04200.
- B. Certifications: Comply with applicable certification requirements of Sections 03300 and 04200.
- C. Mock-Ups: Comply with applicable mockup requirements of Sections 03300 and 04200.

**1.4 SUBMITTALS**

- A. Comply with applicable submittal requirements of Sections 03300 and 04200.
- B. Product Data: Submit product data for all concrete masonry unit products, reinforcement, and accessories proposed for use including the following information:
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.

- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
  - (d) If recycled content product is part of an assembly, indicate relative
  - (e) dollar value of recycled content product to total dollar value of assembly.
2. Regional Materials:
- (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
  - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
  - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
  - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A All masonry units, steel reinforcement, anchors, ties, and accessories to contain recycled content.
- B Formwork: Comply with applicable requirements of Section 03100 Concrete Formwork.
- C Reinforcement: Comply with applicable requirements of Section 03200 Concrete Reinforcement.
- D Grout: Comply with applicable portions of Sections 03300 and 04200.
- E Masonry Materials and Accessories: Comply with applicable requirements of Section 04200 Concrete Unit Masonry.

## **PART 3 EXECUTION**

### **3.1 FORMWORK**

- A. General: Refer to Section 04200 for general installation requirements of unit masonry.
- B. Temporary Formwork: Provide formwork and shores as required for temporary support of reinforced masonry elements. Design, erect, support, brace and maintain formwork.

- C. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar grout, or concrete. Brace, tie, and support as required to maintain portion and shape during construction and curing of reinforced masonry.
- D. Do not remove forms and shores until reinforced masonry member has hardened sufficiently to carry its own weight and all other reasonable temporary loads that may be placed on it during construction.

### **3.2 PLACING REINFORCEMENT**

- A. General: Clean reinforcement of loose rust, mill scale, dirt, or other materials capable of reducing bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross section due to excessive rusting or other causes.
- B. Position reinforcement accurately at the spacing shown. Support vertical bars are shown in close proximity. Provide a clear distance between bars of not less than the nominal bar diameter or 1 inch whichever is greater.
  - 1. For columns, piers, and pilasters, provide a clear distance between vertical bars as shown, but not less than 1-1/2 times the nominal bar diameter or 1-1/2 inch, whichever is greater. Provide lateral ties as shown.
- C. Splice reinforcement bars where shown and according to applicable provisions of Section 03200, Concrete Reinforcement. Do not splice at other points unless acceptable to the A/E. Provide lapped splices, unless otherwise shown. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.
- D. Embed metal ties in mortar joints as work progresses, with a minimum mortar cover of 5/8 inch on exterior face of walls and 1/2 inch at other locations.
- E. Embed prefabricated horizontal joint reinforcing as the work progresses, with a minimum cover of 5/8 inch on exterior face of walls and 1/2 inch at other locations. Lap units not less than 6 inches at ends. Use prefabricated "L" and "T" units to provide continuity at corners and intersections. Cut and bend units as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- F. Anchoring:
  - 1. Anchor reinforced masonry work to supporting structure as indicated.
  - 2. At intersections of reinforced masonry walls with non-reinforced masonry, provide anchorage as shown.

### **3.3 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY**

- A. General:
  - 1. Do not wet concrete masonry units (CMU).
  - 2. Lay CMU units with full-face shell mortar beds.

3. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells.
4. Solidly bed cross-webs of starting courses in mortar.
5. Maintain head and bed joint widths shown, or if not shown, provide 3/8 inch joints.
6. Where solid CMU units are shown, lay with full mortar head and bed joints.

B. Walls:

1. Pattern Bond: Lay CMU wall units in 1/2 running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated.
2. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams, and other special conditions.
3. Maintain vertical continuity of core or cell cavities, to be reinforced and grouted, to provide minimum clear dimensions indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
4. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.

C. Columns, Piers, and Pilasters:

1. Use CMU units of the size, shape, and number of vertical core spaces shown. If not shown, use units providing minimum clearances and grout coverage for number and size of vertical reinforcement bars shown.
2. Provide pattern bond shown, or if not shown, alternate head joints in vertical alignment.
3. Where bonded pilaster construction is shown, lay wall and pilaster units together to maximum pour height specified.
4. Grouting, General:
  - (a) Use "Fine Grout" only where allowed by Section 04200.
  - (b) Use "Coarse Grout" for typical reinforced masonry construction. Use high-slump where height of any lift exceeds 4 feet.
  - (c) Grouting Technique: At the Contractor's option, use either low lift or high-lift grouting techniques subject to the requirements as specified.
5. Low-Lift Grouting:
  - (a) Provide minimum clear dimension of 2 inches and clear area of 8 square inches in vertical cores to be grouted.
  - (b) Place vertical reinforcement before laying of CMU. Extend above elevation of maximum pour height as required to allow

for splicing. Support in position at vertical intervals not exceeding 160 bar diameters.

- (c) Lay CMU to maximum pour height. Do not exceed 4 feet height, or if bond beam occurs below 4 feet height stop pour at course below bond beam.
- (d) Pour grout-using container with spout or by chute or by pumping. Vibrate grout during placing. Place grout continuously. Do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2 inch below top course of pour.
- (e) Bond Beams: Stop grout in vertical cells 1-1/2 inch below bond beam course. Place horizontal reinforcing in bond beams. Lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.
- (f) High-Lift Grouting:
  - (1) Do not use high-lift grouting technique for grouting of CMU unless minimum cavity dimension is 3 inches and 10 square inches, respectively.
  - (2) Provide clean-out holes in first course at all vertical cells to be filled with grout.
    - (a) Use units with one face shell removed and provide temporary supports for units above, or use header units with concrete brick supports, or cut openings in one face shell.
  - (3) Construct masonry to full height of maximum grout pour specified, before placing grout.
  - (4) Limit grout lifts to a maximum height of 4 feet and grout pour to a maximum height of 12 feet, for single wythe hollow concrete masonry walls, unless otherwise indicated.
  - (5) Place vertical reinforcement before grouting. Place before or after laying masonry units, as required by job conditions. Tie vertical reinforcement to dowels at base of masonry where shown and if reinforcement is placed first, thread CMU over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 10 feet.
    - (a) Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing shown.
  - (6) Place horizontal beam reinforcement as the masonry units are laid.
  - (7) Embed lateral tie reinforcement in mortar joints where shown. Place as masonry units are laid, at the vertical spacing shown.
  - (8) Preparation of Grout Spaces: Before grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry, and other



foreign materials from grout spaces. Clean reinforcing and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close clean-out holes and brace closures to resist grout pressures.

- (9) Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.
- (10) Place grout by pumping into grout spaces unless alternate methods are acceptable to the A/E.
- (11) Limit grout pours to sections, which can be completed in one working day with not more than one-hour interruption of pouring operation.
  - (a) Place grout in lifts, which do not exceed 4 feet.
  - (b) Allow not less than 30 minutes, nor more than one hour between lifts of a given pour.
  - (c) Vibrate each grout lift during pouring operation.
  - (d) Place grout in lintels or beams over openings in one continuous pour.
- (12) Where bond beam occurs more than one course below top of pour, fill bond beam course to within 1 inch of vertically reinforced cavities, during construction of masonry.
- (13) When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 1-1/2 inch of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

## **END OF SECTION**

**SECTION 04530**  
**MASONRY PATCHWORK**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Related Sections:
  - 1. Section 04200-Unit Masonry.
  - 2. Section 03300-Cast In Place Concrete Reinforcing.

**1.2 REFERENCES**

- A. Comply with reference requirements of 03300 and 04200.

**1.3 SUBMITTALS**

- A. Comply with applicable submittal requirements of 03300 and 04200.

**1.4 QUALITY ASSURANCE**

- A. Submit unit masonry manufacturer's "CM-2" Certificate of Compliance issued by the Florida Concrete and Products Association for each type of unit masonry specified.
- B. Certifications: Comply with applicable sections of 03300 and 04220.

**1.5 PROJECT CONDITIONS**

- A. Environmental Conditions:
  - 1. Temperature: 40 degrees F. minimum and rising.
  - 2. Weather: No application during precipitation.

**PART 2 PRODUCTS**

**2.1 LOAD BEARING AND NON BEARING CONCRETE UNIT MASONRY**

- A. Weight: Normal.
- B. Size: Eight inches x 16 inches x 8 inches thick or as indicated on drawings, 2-cell stretcher type.
- C. Texture: Medium.
- D. Grade: ASTM C90; Grade N-2.

**2.2 CONCRETE BRICK**

- A. Grade: ASTM C55, Grade N-2.
- B. Size: Appropriate to suit conditions.

**2.3 MORTAR**

- A. Portland Cement: ASTM C150, Type I, domestic.
- B. Masonry Cement: ASTM C91, domestic.
- C. Sand: ASTM C144.
- D. Water: Potable.
- E. Mortar Mix: ASTM C270, Type S, 1800psi or Type M, 2500psi. Mix accurately in following proportions by volume. Mortar type shall be determined by use and location of masonry as per the Florida Building Code, UON on the drawings.

## **2.4 REINFORCEMENT**

- A. Provide horizontal joint reinforcing in each course.
- B. Provide ties to existing materials at sides of patch, at each course.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Patching
  - 1. Remove existing mortar from new opening.
  - 2. Fill in as required with new concrete masonry units and fresh mortar.
- B. Laying Units:
  - 1. Lay masonry plumb, true to line, with level and accurately spaced courses.
  - 2. Keep bond plumb throughout.
  - 3. Where adjustment must be made after mortar has started to harden, remove mortar and replace with fresh mortar.
  - 4. Cut masonry units dry.
  - 5. Joints: 3/8inch thick thickness, strike flush.

### **3.2 JOINTING METHODS**

- A. Lay concrete block with full beds of mortar on vertical and horizontal face shells.
- B. Furrowing of mortar is not allowed.
- C. Pointing: Point holes in masonry. Cut out and point up defective joints.

### **3.3 MORTAR FILLED ITEMS**

- A. Where necessary and where indicated on drawings.
- B. Voids around penetrations through block work.

**END OF SECTION**

## **SECTION 05210**

### **STEEL JOISTS**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Open web joists, with bridging, associated components, accessories.

##### **1.2 RELATED SECTIONS**

- A. 01572-Construction Waste Management.
- B. 03300-Cast In Place Concrete.
- C. 05120-Structural Steel.
- D. 05310-Steel Deck.
- E. 05500-Metal Fabrication.
- F. 09900-Painting.

##### **1.3 REFERENCES**

- A. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations
- B. Steel Joist Institute (SJI). “Standard Specifications For Steel Joists and Joist Girders.” Maintain one copy in field office for use of the contractors’ personnel, the project consultants and Broward County Representatives.

##### **1.4 SUBMITTALS**

- A. Product Data:
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Submit shop and erection drawings for review, showing joist fabrication details, erection details, anchorage details, bridging details, bottom chord

extensions, and marking of joists before starting work. Note the design gravity and wind loads.

- C. Submit product data including properly identified catalogs, material specifications, and shop painting specifications before starting work.
- D. Engineering Design Computations with Respect to Specified Up-Lift Load Requirements and American Society of Civil Engineers (ASCE), 7-02 as noted on the contract drawings. Calculations and shop drawings shall be signed and sealed by a professional engineer (licensed in the State of Florida) as the delegated engineer.
- E. Submit certification that engineering design and calculations for steel joists conform to standard specifications of Steel Joist Institute.

### **1.5 QUALITY ASSURANCE**

- A. Steel Joist Institute (SJI): Comply with “Standard Specifications, Load Tables, and weight tables for steel joist and joist girders.
- B. Joist manufacturer shall be a member of the Steel Joist Institute in good standing.
- C. Certification Labels: Provide evidence of compliance with applicable material specifications in appropriate standards.
- D. Certification of Field Welders: Conform to requirements of Section 05120.
- E. Erector Qualifications: An experienced erector on comparable projects (size and type).

### **1.6 FABRICATION**

- A. Design and Manufacture: Comply with S.J.I.'s “Standard Specifications Load Tables and Weight Tables for Steel Joist and Joist Girders.”
- B. Do not fabricate joists using the “Electrical Resistance Welding Method.”

### **1.7 PRODUCT DELIVERY AND STORAGE**

- A. Delivery:
  - 1. Do not deliver material to project site until proposed method and sequence of erection has been reviewed and accepted by A/E.
  - 2. Plan methods and sequence of operations to avoid delay or damage to work of other trades.
- B. Storage:
  - 1. Store joists above ground and water on platforms, skids, or other appropriate supports.
  - 2. Place joists while in storage in an upright position with a minimum of 3 support points falling at panel points.

3. Stack joist bundles a maximum of 3 high and prevent introduction of localized stresses and damage while in storage.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. All manufactured steel joist products are to contain recycled content.
- B. Steel joist numbers indicated on the drawings are according to the standard designations of the SJI. Comply with the SJI.
- C. Accessories and Fittings, Including End Supports, Anchors, Bolting, and Bridging: Provide according to the standard specifications used to design the joists.
- D. Bottom Chord Extensions: Provide for support of ceilings and soffits on joists where ceiling below is noted on the plans.
- E. Engineered Bottom Chord and Extension: Provide where joist is required to provide bottom flange bracing of support beam in uplift condition.
- F. Shop Painting: Paint joists with manufacturer's standard primer according to the requirements of the SJI.
- G. Joist Design: Design joists for tabular loads specified in SJI standards and for stress reversal (separate condition) due to a net uplift (wind) as provided on structural drawings.
- H. Camber:
  1. Provide joist with enough camber to prevent excessive deflection due to any possible localized ponding directions.
  2. Follow manufacturer's recommendations and guidelines.

## **PART 3 EXECUTION**

### **3.1 ERECTION**

- A. Handle joists in a manner to avoid damage to joist. Handling and erection shall be in compliance with SJI Technical Digest No.9, July 1987 "Handling and Erection of Steel Joists and Girders."
  1. Remove damaged joists from site, unless field repair is feasible and practical as determined by consultant and such repairs are satisfactory made according to joist manufacturer's recommendations in writing.
  2. Accurately set joists with end bearing and according to standard specifications.

3. Secure bridging and anchoring in place before application of construction loads and distribute temporary loads so that carrying capacity of any joist or group of joists is not exceeded.
  - (a) Deviation from a straight line between ends of any installed joists shall not exceed 3/8 inch in 10 feet.
  - (b) Joists shall be installed vertical, plumb and straight (no side sweep).
- B. Installation, Anchorage and Bridging: Perform work according to SJI Specifications, unless otherwise noted.
- C. Do not cut or alter joists without approval of Project Consultant.

### **3.2 FIELD QUALITY CONTROL**

- A. Clean abraded, corroded, and field welded areas and touch-up paint with a field-applied coat of rust inhibitive paint of a different shade or color than the shop applied coat.

**END OF SECTION**

## SECTION 05310

### STEEL DECK

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Steel floor or roof deck and accessories.

##### 1.2 RELATED SECTIONS

- A. Section 01572-Construction and Waste Management
- B. Section 03520-Insulating Concrete.
- C. Section 05120-Structural Steel.
- D. Section 05210-Steel Joists.

##### 1.3 REFERENCES

- A. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

##### 1.4 SUBMITTALS

- A. Product Data:
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Include manufacturer's specifications and installation instructions for each type of decking and accessories.
  - 1. Provide certified test data for mechanical fasteners used instead of welding for fastening deck to supporting structures.
- C. Shop Drawings: Show layout and types of deck units, anchorage details, and conditions requiring closure strips, supplementary framing, sump pans, cant strips, cut openings, special jointing, and other accessories.

##### 1.5 QUALITY ASSURANCE



- A. Codes and Standards: Comply with the following codes and standards: (Current edition, UON)
  - 1. American Iron and Steel Institute (AISI), Specification for the Design of Cold-Formed Steel Structural Members”.
  - 2. American Welding Society (AWS), D1.3 “Structural Welding Code – Sheet Steel”.
  - 3. Steel Deck Institute (SDI), “Design Manual for Composite Decks, Form Decks, and Roof Decks”.
- B. Qualification of Field Welding: Use qualified welding processes and welding operators according to “Welder Qualification” procedures of AWS.
- C. Erector Qualifications: an experienced erector on comparable size projects (size and type)

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, provide products of one of the following:
  - 1. H. H. Robertson Co.
  - 2. United Steel Deck, Inc.
  - 3. Vulcraft Div., Nucor Corp.
  - 4. Wheeling Corrugating Co.

### **2.2 MATERIALS**

- A. All manufactured steel deck products are to contain recycled content.
- B. Steel for Galvanized Metal Deck Units: ASTM A 446, grade E and A required to comply with SDI Specifications.
- C. Miscellaneous Steel Shapes: ASTM A 36.
- D. Shear Connectors: Headed stud type, ASTM A 108, Grade 1015 or 1020, cold-finished carbon steel, with dimensions complying with AISC specifications.
- E. Sheet Metal Accessories: ASTM A 526, commercial quality galvanized.
- F. Galvanizing: ASTM A 525, G90.
- G. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair according to procedures specified in ASTM A780.
- H. Paint: Manufacturer’s baked-on, rust-inhibitive paint, for application to metal surfaces that have been chemically cleaned and phosphate chemical treated.
- I. Flexible Closure Strips: Manufacturer’s standard vulcanized, closed-cell, synthetic rubber.

### **2.3 FABRICATION**

- A. Form deck units in lengths to span 3 or more supports, with flush, telescoped, or nested 2-inch laps at ends and interlocking or nested side laps, of metal thickness, depth, and width as indicated.
- B. Roof Deck Units: Provide deck configurations complying with SDI "Specifications and Commentary for Steel Roof Deck".
- C. Composite Steel Floor Deck:
  - 1. Fabricate deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slabs.
  - 2. Fabricate open-beam deck units with fluted section having interlocking side laps.
- D. Roof Sump Pans:
  - 1. Fabricate from single piece of 0.071 inch minimum (14 gage) galvanized sheet metal with level bottoms and sloping sides to direct water flow to drain.
  - 2. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide.
  - 3. Recess pans not less than 1-1/2 inch below roof deck surface unless otherwise shown or required by deck configuration.
  - 4. Holes for drains will be cut in the field by others.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
- B. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units. Install deck units and accessories according to manufacturer's recommendations, Shop Drawings, and as specified.
- C. Place deck units flat and square, secured to adjacent framing without warp or deflection.
- D. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
- E. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- F. Do not use floor deck units for storage or working platforms until permanently secured.
- G. Fastening Deck Units:
  - 1. Fasten roof deck units to steel supporting members by not less than 5/8 inch diameter puddle welds or elongated welds of equal strength, spaced not more than 12 inches at every support, and adjust weld size and/or spacing to conform with the requirements of the Contract

- Documents where indicated. In addition, secure deck to each supporting member in ribs where side laps occur.
2. Comply with AWS requirements and procedures for manual shielded metal arch welding, appearance and quality of welds, and methods used in correcting welded work.
    - (a) Use welding washers at all metal deck thinner than 22 gage.
  3. Pneumatically driven mechanical fasteners may be used instead of welding. Locate mechanical fasteners and install according to deck manufacturer's instructions.
  4. Mechanically fasten side laps of adjacent deck units between supports, at intervals as shown on the drawings, but not further than 24 inch c/c for floor decks and 12 inch c/c for roof decks.
  5. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading, as noted or shown on the drawings.
- H. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or next to the decking, as shown.
- I. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.
- J. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches o.c. with at least one weld at each corner.
- K. Shear Connectors: Weld shear connectors to supports through decking units according to manufacturer's instructions. Do not weld shear connectors through 2 layers (lapped ends) of decking units. Weld only clean, dry deck surfaces.
- L. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction. Weld into position to provide a complete decking installation.
- M. Provide flexible closure strips instead of metal closures, at Contractor's option, wherever their use will ensure complete closure. Install with adhesive according to manufacturer's instructions.
- N. Touch-up Painting: After decking installation, wire brush, clean, and paint scarred areas, welds, and rust spots on top and bottom surfaces of decking units and supporting steel members.
  1. Touch-up galvanized surfaces with galvanizing repair paint applied according to manufacturer's instructions.
  2. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.
  3. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

## END OF SECTION

## SECTION 05400

### COLD FORMED METAL FRAMING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Load bearing and non-load bearing steel stud walls and soffit systems.
- B. Steel joists and rafters.
- C. Steel trusses.

##### 1.2 RELATED SECTIONS

- A. Section 01572-Construction Waste Management.
- B. Section 05500-Metal Fabrications.
- C. Section 08110-Steel Doors and Frames.
- D. Section 09220-Portland Cement Plaster Stucco.
- E. Section 09250-Gypsum Board.

##### 1.3 REFERENCES

- A. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations

##### 1.4 SUBMITTALS

- A. Product Data:
  - 1. Submit properly identified manufacturer's literature and technical data including specifications and installation instructions before starting work.
  - 2. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

##### B. Samples:

City of Tampa, Florida  
Kid Mason Community Center

Section 05400  
Cold Formed Metal Framing  
07-15-2022

1. Metal framing.
  2. Required accessories.
- C. Shop Drawings: Show layouts and sections coordinated with contract documents showing framing, anchorage accessories, and connection details.
1. For systems not completely detailed in Contract Documents, provide the following in addition to shop drawings:
    - (a) Structural design calculations for framing members, connections and accessories. (to be provided upon request)
    - (b) Calculate structural properties of framing and accessories in accordance with AISI "Specification" for the Design of Cold Formed Steel Structural Members.
    - (c) Trusses: ASTM A 653/653M steel G60 galvanized. Provide manufacturer's standard chord and web member profiles with mechanical properties as required by structural design calculations. Shop fabrication required.
    - (d) Design trusses in accordance with AISI "Design Guide for Cold-Formed Steel Trusses, Publication RG-9518."
    - (e) Determine mechanical properties by testing in accordance with ASTM A 370.
    - (f) Configure web members as shown on Shop Drawings.
  2. Calculations and Engineered Shop Drawings shall be signed and sealed by a Florida Registered Professional Engineer.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Light Gage Metal Framing:
1. Clark Framing Systems, Inc.
  2. Dietrich Metal Framing.
  3. MarinoWare Industries, Inc.
  4. Unimast Incorporated (USG).

### **2.2 MATERIALS**

- A. All manufactured cold formed metal framing products are to contain recycled content.
- B. Steel Studs thickness and grade as required by Contract Drawings or Shop Drawings, but not less than the following:
1. 4 inch, 20 gage (minimum), galvanized.
  2. 6 inch, 20 gage (minimum), galvanized.
  3. 8 inch, 18 gage (minimum), galvanized.
- C. Steel Runner Track thickness and grade as required by Contract Drawings or Shop Drawings, but not less than the following:
1. 20 gage for 4 inch and 6 studs.
  2. 18 gage for 8-inch studs.

- D. Coating: Steel studs and runner track shall comply with ASTM 525 and have a G-60 galvanized coating.
- E. Steel Studs, Runner Track, and Accessories:
  - 1. 12, 14, and 16 Gage: Form of steel meeting the requirements of ASTM A653, Grade D, with a minimum yield of 50,000 psi.
  - 2. 18, 20 and 22 Gage: Form of steel meeting with the requirements of ASTM A653, Grade A, with a minimum yield of 33,000 psi.
- F. Metal Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by Contract Drawings or Shop Drawings (as applicable).

### **PART 3 EXECUTION**

#### **3.1 INSPECTION**

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

#### **3.2 INSTALLATION**

- A. Use of powder- actuated shots is prohibited, except in anchoring tracks to concrete or steel.
- B. Stud Spacing: Maximum 16 inches on center, unless otherwise indicated on the drawings.
  - 1. Frame corners with three studs.
  - 2. Frame wall openings wider than stud spacing with double 20 gauge studs at each jamb. Connect studs with clips min 48 inch AF and one at head.
- C. Runner Track: Securely anchor to floor and overhead structure as detailed on Contract Drawings or Shop Drawings (as applicable).
- D. Seat studs squarely in runner track with stud web and flanges abutting track web, plumbed and aligned, and securely attached to flanges each side or web of both upper and lower runner tracks, with no. 8 screws, unless otherwise noted.
- E. Install framing accessories and bridging as shown on Contract Drawings or Shop Drawings as applicable.

**END OF SECTION**

## SECTION 05500

### METAL FABRICATIONS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Steel sections, tubing, sheets, bolts, nuts, washers, welding materials, & primer.

##### 1.2 RELATED SECTIONS

- A. Section 01572-Construction Waste Management
- B. Section 03300-Cast In Place Concrete.
- C. Section 03415-Precast, Prestressed Sections.
- D. Section 04200-Concrete Unit Masonry.
- E. Section 05120-Structural Steel.
- F. Section 05210-Steel Joists.
- G. Section 05511-Metal Stairs.
- H. Section 05520-Metal Handrails and Railings.
- I. Section 09900-Paints and Coatings: Field applied paint finish.
- J. Section 05551-Stair Nosing.

##### 1.3 REFERENCES

- A. Aluminum Association:
  - 1. AA DAF-45-Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association:
  - 1. AAMA 611-Voluntary Specification for Anodized Architectural Aluminum.
- C. ASTM International (ASTM):
  - 1. ASTM A36/A36M-Standard Specification for Carbon Structural Steel.
  - 2. ASTM A53/A53M-Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 3. ASTM A123/A123M-Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 4. ASTM A153/A153M-Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 5. ASTM A167-Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - 6. ASTM A307-Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

7. ASTM A312/A312M-Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
  8. ASTM A325-Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  9. ASTM A354-Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
  10. ASTM A479/A479M-Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
  11. ASTM A500-Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  12. ASTM A501-Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
  13. ASTM A554-Standard Specification for Welded Stainless Steel Mechanical Tubing.
  14. ASTM A563-Standard Specification for Carbon and Alloy Steel Nuts.
  15. ASTM A572/A572M-Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
  16. ASTM B26/B26M-Standard Specification for Aluminum-Alloy Sand Castings.
  17. ASTM B85-Standard Specification for Aluminum-Alloy Die Castings.
  18. ASTM B209/B209M-Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  19. ASTM B210/B210M-Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
  20. ASTM B211/B211M-Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
  21. ASTM B221/B221M-Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  22. ASTM B695-Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  23. ASTM F1554-Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- D. American Welding Society:
1. AWS A2.4-Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1-Structural Welding Code - Steel.
  3. AWS D1.2-Structural Welding Code – Aluminum.
  4. AWS D1.6-Structural Welding Code - Stainless Steel.
- E. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations
- F. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1-Joint Finishes.
- G. OSHA (Occupational Safety and Health Standards):
1. Safety and Health Regulations for Construction, Part 1926 Subpart X, 1926.1053 - Ladders.
- H. SSPC: The Society for Protective Coatings:
1. SSPC-Steel Structures Painting Manual.
  2. SSPC Paint 15-Steel Joist Shop Paint.
  3. SSPC Paint 20-Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).



## **1.4 SUBMITTALS**

- A. Product Data:
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

## **1.5 QUALITY ASSURANCE**

- A. Finish joints in accordance with NOMMA Guideline 1.

## **1.6 QUALIFICATIONS**

- A. Design fabrications under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Florida.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01600-Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

## **1.8 FIELD MEASUREMENTS**

- A. Verify field measurements are as indicated.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS – METAL FABRICATIONS**

- A. All metal fabrication products are to contain recycled content.
- B. Steel Sections: [ASTM A36/A36M.] and/or [ASTM A572/A572M; Grade 50.]
- C. Steel Plate: [ASTM A36/A36M.] and/or [ASTM A572/A572M; Grade 50.]
- D. Hollow Structural Sections: [ASTM A500, Grade B.] and/or [ASTM A501.]
- E. Steel Pipe: ASTM A53/A53M, Grade B Schedule 40.
- F. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality with galvanized coating.
- G. Bolts: ASTM A307; Grade A or B and/or ASTM A325; Type 1  
1. Finish: Unfinished or Hot dipped galvanized.
- H. Nuts: ASTM A563 heavy hex type.  
1. Finish: Unfinished and/or Hot dipped galvanized as noted
- I. Washers: ASTM F436; Type 1.  
1. Finish: Unfinished, and/or Hot dipped galvanized as noted
- J. Welding Materials: AWS D1.1; type required for materials being welded, Class E60 or E70 for manual welds.
- K. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- L. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

## **2.2 MATERIALS - STAINLESS STEEL**

- A. Bars and Shapes: ASTM A479/A479M, Type 304
- B. Tubing: ASTM A269 or ASTM A554; Type 304
- C. Pipe: ASTM A312/A312M, seamless, Type 304.
- D. Plate, Sheet and Strip: ASTM A167; Type 304.
- E. Bolts, Nuts, and Washers: ASTM A354.
- F. Welding Materials: AWS D1.6; type required for materials being welded.

## **2.3 MATERIALS - ALUMINUM**

- A. Extruded Aluminum: ASTM B221/B221M, Alloy 6063], Temper T5 or T6.
- B. Sheet Aluminum: ASTM B209/B209M, Alloy 5050-H-32, or temper best suited to application.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, Alloy 6063, Temper T6.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, Alloy 6063, Temper T6.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.

- F. Aluminum-Alloy Die Castings: ASTM B85.
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2; type required for materials being welded.

#### **2.4 LINTELS**

- A. Lintels: Steel sections, size and configuration as indicated on Drawings, length to allow 8 inches minimum bearing on both sides of opening.
  - 1. Exterior Locations: Galvanized.
  - 2. Interior Locations: Prime paint, one coat.

#### **2.5 LEDGE AND SHELF ANGLES**

- A. Ledge and Shelf Angles, Not Attached to Structural Framing: For support of metal decking or joists; prime paint, one coat.

#### **2.6 DOOR FRAMES**

- A. Door Frames: Steel Channel sections, size indicated on Drawings, with jamb anchors suitable for building into masonry or attachment to concrete or steel framing, minimum 4 anchors per jamb; prime paint, one coat.

#### **2.7 BOLLARDS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, 6 inches diameter, length as indicated on Drawings; prime paint, one coat.
- B. Concrete Fill: 3,000 psi as specified in Section 03300.
- C. Anchors: Concealed type as indicated on Drawings.

#### **2.8 WALL PROTECTION PLATES AND CORNER GUARDS**

- A. Wall Protection Plates: Stainless steel plate, 1/8 inch thick, counter sunk fasteners, beveled exposed edges, size as indicated on Drawings.
- B. Corner Guards: Stainless steel angle, 3 x 3 x 1/8 inch, counter sunk fasteners, beveled exposed edges, size as indicated on Drawings.]

#### **2.9 ANCHOR BOLTS**

- A. Anchor Rods: [ASTM F1554; Grade 55, weldable. or ASTM A307; Grade A.
  - 1. Shape: Hooked.
  - 2. Furnish with nut and washer; unfinished.
- B. Drilled In Expansion Anchors.
  - 1. HILTI Corporation, Tulsa, OK
  - 2. Powers Fasteners, Brewster, NY.
  - 3. ITW Redhead, Woodsdale IL

#### **2.10 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.

- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish 2.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## **2.11 FACTORY APPLIED FINISHES - STEEL**

- A. Prepare surfaces to be primed in accordance with SSPC SP 2.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat except where galvanizing is specified.
- D. Galvanizing: ASTM A123/A123M; [minimum 1.2oz/sq ft coating thickness; galvanize after fabrication.
- E. Galvanizing for Fasteners, Connectors, and Anchors:
  1. Hot-Dipped Galvanizing: ASTM A153/A153M.
  2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

## **2.12 FACTORY APPLIED FINISHES - STAINLESS STEEL**

- A. Satin Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.

## **2.13 FACTORY APPLIED FINISHES - ALUMINUM**

- A. Finish coatings to conform to AAMA 611. Comply with AA DAF-45.
- B. Interior/Exterior Aluminum Surfaces: AAMA A41 anodized, Class I, clear color.
- C. Interior/Exterior Aluminum Surfaces: AAMA A43 anodized, Class I, to selected color.

## **2.14 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.

- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches .

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01300-Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive Work.

#### **3.2 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

#### **3.3 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- C. Field weld components indicated on Drawings.
- D. Perform field welding in accordance with the applicable AWS structural welded code (for the materials being welded).
- E. Obtain approval of Architect/Engineer prior to site cutting or making adjustments not scheduled.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.

#### **3.4 ERECTION TOLERANCE**

- A. Section 01400-Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

## **SECTION 06100**

### **CARPENTRY**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Grounds, nailers, blocking, miscellaneous framing, plywood backing panels, plywood sheathing, preservative treatment, and necessary accessories indicated or specified in this section.

##### **1.2 RELATED SECTIONS**

- A. Section 06300-Wood Treatment.
- B. Section 10100-Visual Display Boards and Cases.
- C. Section 10165-Plastic Toilet Partitions.

##### **1.3 REFERENCES**

- A. ASLS-American Softwood Lumber Standards.
- B. ASTM American Society of Testing and Materials.
  - 1. D6007 Determination of Formaldehyde Concentration in Air from Wood Products.
  - 2. D6330 Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels.
  - 3. E1333-Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber
- C. APA-The Engineered Wood Association.
- D. FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- E. GREENGUARD™ Product Emission Standard for Children & Schools.
- F. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- G. SPIB-Southern Pine Inspection Bureau.

##### **1.4 SUBMITTALS**

- A. Certification of Compliance: Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Product Data
  - 1. Low Emitting Materials.

- (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
  - (b) Submit manufacturer's certification that all products comply with Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
2. Recycled Content:
- (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
  - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
  - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
  - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
3. Regional Materials:
- (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
  - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
  - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
  - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
4. Sustainable Forestry:
- (a) Forest Stewardship Council (FSC): Provide of Chain-of-custody certificates signed by the lumber supplier validating compliance with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
  - (b) Submit copies of invoices indicating cost data and the FSC certification numbers for each product.
  - (c) Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.

## 1.5 QUALITY ASSURANCE

- A. Factory mark each piece of lumber and plywood to identify type, grade, agency providing inspection service, producing mill and other qualities as specified.
- B. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body

to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

**C. Engineered Wood Products:**

1. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
2. Determine Volatile Organic Compounds (VOC), excluding formaldehyde, emitted from manufactured wood-based panels in accordance with ASTM D6330.

**1.6 DELIVERY AND STORAGE**

- A. Keep materials dry during delivery and storage.**
1. Protect against weather and contact with damp or wet surfaces.
  2. Stack lumber and plywood and provide air circulation.

**1.7 SITE CONDITIONS**

- A. Powder driven fasteners are not allowed.**

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- A. All engineered wood products to contain recycled wood materials.**
- B. All wood products shall comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship".**
- C. All plywood products shall comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.**
- D. Exterior Plywood:**
1. Conform with US Department of Commerce PS 1-66, bearing APA grade mark.
  2. Grade: APA rated sheathing, EXT, span rating to suit rafter spacing.
  3. Thickness: Indicated on Drawings.
- E. Interior Plywood (Concealed): Where plywood will be concealed by other Work, provide exterior type plywood C-D plugged grade, unless otherwise specified.**
- F. Interior Plywood (Painted Finish): Same as concealed, except with hardwood plywood or medium density overlay, Grade MDO EXT-101; smooth surface with no grooves.**



- G. Interior Plywood (Transparent Finish):
1. Exterior type plywood, Grade A veneers on exposed surfaces, Grade B veneers on semi-exposed surfaces, and Grade D or better veneers on concealed surfaces.
    - (a) Birch: (Natural) (Select) (Rotary Cut) (Red) (White).
- H. Lumber Standard:
1. Comply with American Softwood Lumber Standards PS-20 by U.S. Department of Commerce.
  2. Nominal sizes are shown or specified, except as shown by actual dimensions.
  3. Provide actual sizes complying with minimum size requirements for PS-20 for moisture content specified for each use.
  4. Moisture Content: Seasoned lumber with 19 percent maximum moisture content at time of dressing and complying with dry size requirements of PS-20, unless otherwise specified.
- I. Boards:
1. Complying with dry size requirements of PS-20 where lumber less than 2 inches in nominal thickness and 2 inches or more in nominal width is shown or specified.
  2. Moisture Content (Exposed Work and Concealed Work): Moisture content of 19 percent maximum, S-DRY Southern Pine No. 2 per SPIB for paint finish.
- J. Dimension Lumber and Timber:
1. Lumber complying with grading rules under provisions of requirements of National Grading Rule for Dimension Lumber of American Lumber Standards Committee established under PS-20.
  2. Light Framing (2 inches minimum thickness and 4 inches minimum width): "Stud" grade lumber for stud framing and "standard" grade for other light framing.
- K. Miscellaneous Materials:
1. Fasteners and Anchorages:
    - (a) Provide size, type, material, and finish and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices.
    - (b) Provide metal hangers and framing anchors of size and type recommended by the manufacturer for each use including recommended nails.
    - (c) Where rough carpentry Work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with hot-dip zinc, ASTM A153.
  2. Building Paper: ASTM D226, Type I; asphalt saturated felt, non-perforated, 15-pound type.
- L. Treated Wood: Under provisions of Section 06300 - Wood Treatment.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Protect installed carpentry Work from damage by Work of other trades until accepted by the Owner.
  - 1. Review proposed protection methods with Project Consultant and Owner for acceptance.
- B. Examine substrates, adjoining construction, and conditions where Work is to be installed.
- C. Do not proceed with Work where unsatisfactory conditions exist.
- D. Where rough carpentry is fitted to other Work, obtain measurements of other Work and verify dimensions shown on shop drawing details.
- E. Apply heavy brush coat of same chemical treatment material to surfaces exposed by sawing, cutting, or drilling.

### **3.2 INSTALLATION**

- A. Materials: Use only sound, thoroughly seasoned materials of longest practical lengths and sizes to minimize jointing, free from warp that cannot be easily corrected by anchoring and attachment.
- B. Installation
  - 1. Closely fit and accurately set members to required lines and levels, and rigidly secure in place.
  - 2. Attachment and Anchorage:
    - (a) Ensure nail size and nail spacing is sufficient to develop adequate strength for connection without splitting the member.
    - (b) Countersink nail heads on exposed carpentry Work and fill holes.
    - (c) Provide hot dip galvanized finish for anchors and attachments, except where otherwise shown
    - (d) Use common wire nails, except as otherwise shown or specified.
    - (e) Use finishing nails for finish Work.
    - (f) Select fasteners of size that shall not penetrate members where opposite side will be exposed to view or shall receive finish materials.
    - (g) Make tight connections between members.
    - (h) Install fasteners without splitting wood, pre-drill as necessary.
  - 3. Wood Grounds, Nailers, Blocking, and Sleepers:
    - (a) Provide as shown and as required for screeding or attachment of other Work.
    - (b) Form to shapes as shown and cut as required for true line and level of Work to be attached.
    - (c) Set true to line and level, plumb, with intersections true to required angle.

- (d) Coordinate location with other work involved.
  - (e) Provide wood blocking to strengthen and supplement horizontal metal stud framing members between studs required for recessed and surface mounted items including, but not limited to, cabinets, finish hardware, magnetic door holding devices, markerboards.
  - (f) Cut blocking to fit between framing members and rigidly attach thereto.
  - (g) Secure blocking and nailers to building structure as indicated and as specified.
  - (h) Provide wood grounds for attachment of finish trim and other Work to plaster.
  - (i) Grounds: Dressed, preservative treated. Use key-beveled lumber not less than 2-inch nominal width and of thickness required to bring face of ground to exact thickness of finish material involved.
  - (j) Remove temporary grounds when not longer required.
4. Roof Sheathing: Nail or staple to framing and use spacer clips at edges for expansion and construction control.

**END OF SECTION**

**SECTION 06300**  
**WOOD TREATMENT**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Preservative water-borne treatment of lumber and plywood.

**1.2 RELATED SECTIONS:**

- A. Section 06100-Carpentry.
- B. Section 06400-Architectural Woodwork.

**1.3 REFERENCES**

- A. AWPAC20-Structural Lumber, fire Retardant Treatment by Pressure Process; American Wood Preservers Association.
- B. AWWA C27-Plywood, Fire Retardant Treatment by Pressure Process; American Wood Preservers Association.
- C. AWPB-American Wood Preservers Bureau.

**1.4 SUBMITTALS**

- A. Wood Treatment Data:
  - 1. Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated materials.
  - 2. Preservative Treatment: For each type specified, including certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.
  - 3. Water-Borne Treatment: Include statement that moisture content of treated materials was reduced to levels indicated before shipment to project site.

**1.5 QUALITY ASSURANCE**

- A. Wood treatment shall comply with:
  - 1. Florida Building Code and Florida Fire Prevention Code.

**1.6 WARRANTY**

- A. Treated Wood: Provide manufacturer's standard lifetime warranty.

**PART 2 PRODUCTS**

## **2.1 MATERIALS**

### **A. Preservative Treatment:**

1. Where lumber or plywood is specified to be treated, comply with applicable requirements of AWWA Standards C2, Lumber, and C9, Plywood and of AWPB Standards listed.
2. Mark each treated item with AWPB Quality Mark Requirements.
3. Pressure treat aboveground items with water-borne preservatives to comply with AWPB LP2.
4. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 percent or less and plywood to a moisture content of 15 percent or less.
5. Treat indicated items and the following:
  - (a) Wood cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, windows, flashing, vapor barriers, and waterproofing.
  - (b) Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  - (c) Wood Framing Members: Within 18 inches above grade.
6. Pressure treat the following with water-borne preservatives for ground contact use complying with AWPB LP22:
  - (a) Wood members in contact with ground.
  - (b) Wood members in contact with fresh water.
7. Pressure treat lumber and plywood for wood foundation systems with water-borne preservatives for ground contact to comply with AWPB FDN standard.
8. Complete fabrication of treated items before treatment, where possible.
9. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

## **PART 3 EXECUTION**

### **3.1 APPLICATION**

- A. Place treated lumber and plywood as detailed.
- B. Provide inspection access panels for annual inspection of the condition of the structure and the connector per FBC 423.11

**END OF SECTION**

**SECTION 06400**  
**ARCHITECTURAL WOODWORK**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Casework.
- B. Work Surfaces, Backsplashes, and Side splashes.
- C. Hardware for Casework including locks and magnetic catches.
- D. Tracks for sliding drawer and cabinet door assemblies.
- E. Plastic Laminate.
- F. Glazing.
- G. Sealant.

**1.2 RELATED SECTIONS**

- 1. Section 06100-Carpentry.
- 2. Section 09650-Resilient Flooring.

**1.3 REFERENCES**

- A. AWI-Architectural Woodwork quality Standards Illustrated; Architectural Woodwork Institute.
- B. BHMA A156.9-American National Standard for Cabinet Hardware; builders Hardware Manufacturers Association (ANSI/BHMA).
- C. GREENGUARD Product Emission Standard for Children & Schools.
- D. GSA CID A-A1936-Adhesive, contact, Neoprene rubber; Federal Specifications and Standards.
- E. NEMA LD 3-high-Pressure Decorative Laminates; National Electrical Manufacturers Association.
- F. PS 1-construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
- G. PS 20-American softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce)
- H. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services

- I. FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- J. ASTM - American Society for Materials and Testing
  - 1. D6007-Determination of Formaldehyde Concentration in Air from Wood Products.
  - 2. D6330-Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels.

#### **1.4 SUBMITTALS**

- A. Shop Drawings: Indicate AWI Quality Grades, plans, elevations, component profiles, details of construction and installation, dimensions, finishes, fittings and fastenings, hardware and accessories.
- B. Product Data: Submit data for items used by architectural woodworker.
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
  - 2. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  - 3. Regional Materials:
    - (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
    - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
    - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
    - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
  - 4. Sustainable Forestry:

- (a) Forest Stewardship Council (FSC): Provide of Chain-of-custody certificates signed by the lumber supplier validating compliance with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- (b) Submit copies of invoices indicating cost data and the FSC certification numbers for each product.
- (c) Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.

- C. Samples:
  - 1. Submit plastic laminate manufacturer's sample chain of color chips and samples of hardware.
  - 2. Submit samples of each wood species with finishes.

## **1.5 QUALITY ASSURANCE**

- A. Lumber Grading: Comply with NIST Voluntary Product Standard PS20.
- B. Standards: Grades as defined by AWI "Quality Standards".
- C. Cabinets shall be designed to support 75 lbs per linear foot per row of shelving. This includes design of attachment to wall or blocking.

## **1.6 MOCK-UP:**

- A. Product mock-up of full size base cabinet, which includes plumbing accessories and fittings.
- B. Locate where directed.
- C. Mock-up may not remain as part of the work.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from damage and moisture.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. All engineered wood, plastic laminate, and hardware materials to contain recycled content.

### **2.2 PLASTIC LAMINATED FINISHED CASEWORK**

- A. Quality Grade: AWI Custom.
- B. Construction: Details conforming to AWI Flush overlay design (unless shown otherwise on Drawings).

### **2.3 WOOD:**

City of Tampa, Florida  
Kid Mason Community Center

Section 06400  
Architect Woodwork  
07-15-2022



- A. All wood products shall comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. All engineered wood products such as plywood and fiberboard shall comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD™ Product Emission Standard for Children & Schools.
- C. Face Frame Rail: 3/4 inch thick lumber.
- D. Plywood: 3/4 inch thick for counters, doors, drawer faces, shelves, cabinet bodies etc.
  - 1. Countertops in which sinks occur must have a core of exterior grade plywood.
- E. Fiberboard: Cabinet backs and drawer bottoms: 1/4-inch thickness minimum, tempered with factory applied gloss surface.
- F. Shelves: 3/4 or 1 inch thickness plywood per AWI and Article 1.3 C above.
- G. Particleboard is not permitted.

#### **2.4 LAMINATE MATERIALS:**

- A. Plastic Laminate: NEMA LD 3, GP-50 General Purpose type; 0.050 inches thick; for horizontal and vertical applications; colors as selected by Project Consultant.
- B. Cabinet Liner: NEMA LD 3, BK20, Backing grade, undecorated plastic laminate; 0.020 inches thick plus or minus 0.004 inches; Color: White.
- C. Acceptable manufacturers
  - 1. Nevamar.
  - 2. Pionite.
  - 3. Wilsonart.

#### **2.5 HARDWARE:**

- A. Types:
  - 1. Drawer Slides: Grant Model No. 329, self-closing clear chromate finish.
  - 2. Surface Mounted Adjustable Shelf Standards: Knape & Vogt #80; satin. All standards within 6 inches of the end of the shelving and space not more than 30 inches apart.
  - 3. Surface Mounted Adjustable Shelf Brackets: Knape & Vogt #180.
  - 4. Recessed Mounted Adjustable Shelf Standards: Knape & Vogt Mfg. Co. No. 255 aluminum shelf standards; length to suit application; unfinished.
  - 5. Recessed Mounted Adjustable Multiple Holes Shelf Clips: Knape & Vogt Mfg. Co. No. 239; zinc-plated steel.

6. Fixed Shelf Brackets: Hafele America No. 287.31.035 and No. 287.31.044; finish: stainless steel.
7. Full Mortise Hinges: Stanley Model No. CB1960; Standard weight, 3 knuckle concealed bearing, steel hinge; stainless steel non-rising pin; US32D finish.
8. Cabinet Hinges: RPC 376-26D-5 knuckle wrap around type allowing 270 degree turn at end of cabinet work unit.
  - (a) Doors up to 48 inches high: Provide 2 hinges.
  - (b) Doors Greater than 48 inches: Provide 3 hinges.
9. Cabinet Pulls: Stanley 4484-US 26D, wire pull.
  - (a) Substitutions: Will be considered by the A/E and Owner when submitted per requirements of Division-0 and Division-1, and Section 01630-Substitution Procedures.
10. Continuous Hinges: Stanley No. STS314-1/4; Type 302 stainless steel; plain finish.
11. Cabinet Locks and Cylinders: Schlage No. CL1000-Series Door Lock or Olympus 700 SC; Solid Brass Cylinder; 626 finish.
12. Drawer Locks and Cylinder: Schlage No. CL2000 Series Drawer Lock or Olympus 800 SC; Solid Brass Cylinder; 626 finish.
13. Cabinet Keys: All casework in individual rooms shall be keyed alike.
14. Surface Bolts: Stanley No. CD4060; solid brass; US3 finish.
15. Grommets: Doug Mockett & Co., Inc. No. EDP-3 Set; Color: Light Grey.

## 2.6 GLAZING:

- A. 1/8 inch thick tempered clear and in compliance with Section 08800-Glazing.

## 2.7 ACCESSORIES:

1. Adhesive: Type recommended by laminate manufacturer to suit application.
  - (a) Toxicity/IEQ: Comply with South Coast Air Quality Management District (SMAQMD) Rule #116 or GREENGUARD Product Emission Standard for Children & Schools.
2. Glass: As specified in Section 08800-Glazing.
3. Fasteners: Size and type to suit application.
4. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; corrosive-resistant finish in concealed locations and chrome-plated finish in exposed locations.

## 2.8 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings. Field fabricated cabinetwork is not acceptable.
- B. Fit shelves, doors, and exposed edges with plastic laminate edging. Use full-length pieces only.
- C. Door and Drawer Fronts: 3/4 inch thick.

- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Apply plastic laminate finish in full-uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 feet from edge of sink cutouts.
- F. Cap exposed plastic laminate edges with material of same finish and pattern.
- G. Mechanically fasten backsplash to countertops with steel brackets at 16 inches on center.
- H. Apply cabinet liner to reverse side of plastic laminate finished surfaces.
- I. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.
- J. Accurately locate and securely install all hardware. Job adjust to operate properly and re-align doors, drawers, etc. as required for proper operation.
- K. Counter tops to have rounded corners in the horizontal plane

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.
- C. Field measurements: Verify all critical dimensions in field prior to fabrication.

### **3.2 INSTALLATION**

- A. Do not proceed with casework installation until resilient flooring has been installed under casework locations.
- B. Set and secure casework in place rigid, plumb, and level.
- C. Carefully scribe casework, which is against other building materials, leaving gaps of 1/16 inch maximum. Do not use additional overlay trim for this purpose.
- D. Use purpose designed fixture attachments at concealed locations for wall mounted components.
- E. Use threaded steel concealed joints fasteners to align and secure adjoining cabinet units and counter tops.

- F. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- G. Counter-sink anchorage devices at exposed locations used to wall mount components, and conceal with solid plugs of material to match surrounding material. Finish flush with surrounding surfaces.
- H. After installation, fill gaps between casework and walls, soffits, etc. with sealant. Provide continuous bead of sealant at joint between cabinet base and flooring. Color shall match cabinets.
- I. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- J. Clean casework, counters, shelves, hardware, fittings and fixtures.

**END OF SECTION**

## SECTION 07145

### CEMENTITIOUS WATERPROOFING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Cement-base waterproof coating for concrete and masonry surfaces.
- B. Work includes all applicable sealants, and repairs needed to ensure a complete waterproof system for concrete and masonry components at locations indicated.

##### 1.2 RELATED SECTIONS

- A. Section 03300-Cast In Place Concrete.
- B. Section 04200-Unit Masonry.

##### 1.3 SUBMITTALS

- A. Materials list of items proposed to be provided under this Section.
- B. Product Data
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
- C. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- D. Manufacturer's current recommended installation procedures which, when reviewed by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
- E. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.
- F. Warranty.

##### 1.4 QUALITY ASSURANCE

- A. Applicator qualifications:

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Kid Mason Community Center

Section 07145  
Cementitious Waterproofing  
07-15-2022

1. Engage an experienced applicator who is certified in writing by waterproofing manufacturer as qualified to install manufacturer's waterproofing. Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to Project site in original containers with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.
- B. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.
- C. Remove and replace material that cannot be applied within its stated shelf life.

## **1.6 WARRANTY**

- A. Provide against defective materials and workmanship for a period of one-year following date of completion.
  1. Manufacturer's standard warranty covering materials.
  2. Applicator's standard warranty covering workmanship.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with the specified requirements, provide products by the following:
- B. Cementitious waterproof coating systems:
  1. "Eucosil" by The Euclid Chemical Company.
  2. "MasterSeal 581" by BASF Construction chemicals LLC.
- C. Quick setting, non-shrink, waterproof patching mortar:
  1. "Speed Plug" by The Euclid Chemical Company.
  2. "MasterSeal 590" by BASF Construction chemicals LLC.
- D. Acrylic bonding agent:
  1. "Flex-Con" by The Euclid Chemical Company.
  2. "Masteremaco A 660" by BASF Construction chemicals LLC.
- E. Substitutions:
  1. Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

- F. Toxicity/IEQ: Comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools

## **2.2 WATER**

- A. Water used shall be clean and potable.

## **2.3 ACCESSORIES**

- A. Provide other materials not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the manufacturer as compatible, subject to review of the Project Consultant.

# **PART 3 EXECUTION**

## **3.1 SURFACE PREPARATION**

- A. Surfaces to be coated must be clean. Chip, sandblast, or grind off all defective materials, glazed smooth concrete, previous coatings, paint and foreign matter such as grease, form oil block filler, curing compounds and efflorescence.
- B. Repair all cracks, joints, holes or breaks with quick setting non-shrink waterproof mortar.
- C. Cut back form ties 1 inch and patch flush and smooth.
- D. Pre-Dampen the surface prior to application of waterproof coating.

## **3.2 MIXING**

- A. Per manufacturer's written instructions.

## **3.3 INSTALLATION**

- A. Apply EUCOSEAL with a stiff fiber brush at an application rate of 2 lb. per 10 FT<sup>2</sup>. Scrub well into damp wall filling all pores and finish with final strokes in one direction. Keep a wet edge. Allow 24 hours to dry. Apply second coat at a rate of 1 lb per 10 FT<sup>2</sup>.
- B. Level Wall, Trowel Application: Mix 2 parts of Eucoseal with 1 part clean white silica sand and trowel apply material to wall at approximately 1/8 inch.

**END OF SECTION**

## **SECTION 07190**

### **VAPOR BARRIER**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Vapor Barrier is to be installed at all interior slab-on-grade.

##### **1.2 RELATED SECTIONS**

- A. Section 02200-Earthwork.
- B. Section 03300-Cast-In-Place Concrete.

##### **1.3 SUBMITTALS**

- A. Submit properly identified manufacturer's literature before starting work.

##### **1.4 QUALITY ASSURANCE**

- A. Regulatory Requirements (Latest Editions): Comply with the requirement of Florida Department of Health and Rehabilitative Services (HRS), Office of Radiation Control as stated in "Radon-Resistant Construction Guidelines for Use in Florida", and Florida Building Code.

#### **PART 2 PRODUCTS**

##### **2.1 MATERIALS**

- A. Vapor Barrier: Ten-mil polyethylene film minimum.
- B. Tape: Type recommended by vapor barrier manufacturer; except at vertical penetrations, use reinforced duct tape.

#### **PART 3 EXECUTION**

##### **3.1 INSTALLATION**

- A. Lay vapor barrier over entire area to receive interior slab work.
  - 1. Lay vapor barrier with seams perpendicular to and lapped in direction of concrete pour.
  - 2. Seal all joints by lapping 4 inches minimum and tape all joints.
  - 3. Turn edges up to 4 inches to top of slab.
  - 4. Where expansion joints are indicated at adjacent vertical surfaces, extend vapor barrier beyond expansion joint filler and turn up to top of slab.



5. Do not allow screed supports or other items to penetrate vapor barrier.
- B. Extend vapor barrier over surfaces of areas to be protected from vapor or transmission from conditioned space to unconditioned space after placement of insulation.
  1. Seal all joints by lapping 4 inches minimum and tape all joints.
  2. Repair any punctures or tears before placement of finished surface materials.
- C. Continuously tape entire perimeter of vapor barrier to adjacent surfaces; around all pipe penetrations; and vapor membrane joints; to seal and prevent vapor moisture penetration.

### **3.2 PROTECTION**

- A. Protect vapor barrier from damage until permanent covering is in place.
  1. Repair punctures and tears in vapor barrier using patches of the material overlapping the puncture or tear a minimum of 12 inches. Seal with tape.

**END OF SECTION**

## SECTION 07270

### FIRESTOPPING AND SMOKE BARRIER CAULKING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Firestopping materials.
- B. Firestopping of all perimeter fire barrier joints, construction joints, and penetrations through or in all fire rated floors and walls and/or smoke barriers and interruptions to fire rated assemblies, whether indicated on the drawings or not, and other openings indicated.

##### 1.2 RELATED SECTIONS

- A. 03300-Cast-In-Place Concrete.
- B. 04200-Unit Masonry.
- C. 04230-Reinforced Unit Masonry.
- D. 07920-Joint Sealers.
- E. 09250-Gypsum Wallboard.
- F. Division 15-Mechanical.
- G. Division 16-Electrical.

##### 1.3 REFERENCES

- A. ASTM E84-Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E119-Standard Method of Fire Tests of Building Construction and Materials.
- C. ASTM E814-Standard Method of Fire Tests of Through-Penetration Firestops.
- D. ASTM E1399-Cyclic Movement and Measuring Minimum and Maximum Joint Widths.
- E. ASTM E1966-Test Method for Resistance of Building Joints.
- F. ASTM E2174-Standard Practice for On-site Inspection of Installed Firestops.

- G. ASTM E2307-Standard Tests Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus.
- H. ASTM E2393-Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems.
- I. Florida Building Code (FBC).
- J. Florida Fire Prevention Code.
- K. FM P7825-Approval Guide; Factory Mutual Research Corporation.
- L. GREENGUARD Product Emission Standard for Children & Schools.
- M. ISO 14021 – 1999; Environmental Labels and Declarations.
- N. National Fire Protection Association (NFPA).
- O. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- P. Underwriters Laboratories (UL):
  - 1. UL Fire Resistance Directory, Volumes 1 & 2
  - 2. UL 263 – Fire Tests of Building Construction Materials
  - 3. UL 723 – Standard Test Method for Surface Burning Characteristics of Building Materials
  - 4. UL 1479 – Fire Test of Through Penetration Fire Stops
  - 5. UL 2079 – Tests for Fire Resistance of Building Joint Systems.
  - 6. UL (FRD)-Fire Resistance Directory; Underwriters Laboratories Inc.

#### **1.4 SUBMITTALS**

- A. Submit a System Design Listing(s) for each perimeter fire barrier joint, construction joint, floor penetration and/or firewall penetration. Include a cover page listing each type of penetration and/or joint along with the System Design Listing for each type of perimeter fire barrier joint, construction joint, floor penetration and/or firewall penetration, including those in smoke barriers.
  - 1. Where there is no specific Systems Design Listing for a particular firestop configuration, the firestop installer shall obtain from the firestop manufacturer an Engineering Judgment (EJ) for submittal. The EJ shall be submitted to the Project Consultant and Owner for acceptance prior to installation.
- B. Submit Manufacturer's Product Data Sheet for each type of product selected.
- C. Submit Manufacturer's Information including each product's VOC and Recycled Content Information.

- D. Submit Fire Stopping Contractor qualifications as noted in “QUALITY ASSURANCE” below.
- E. Work of this section shall not be installed until submittals have been returned accepted by the Project Consultant and the Owner.
- F. Include the following documentation regarding low emitting materials to recycled content:
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer’s Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer’s certification that all products comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
  - 2. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

**1.5 QUALITY ASSURANCE**

- A. All work of this section shall be installed by a single company.
- B. Fire-Test-Response Characteristics: Provide Firestopping System Design Listing by a testing and inspection agency in accordance with the appropriate test standard per “References” above. A qualified testing and inspection agency may be UL, FM Research, Intertek testing Services, Omega Point Laboratories (OPL) or another agency performing testing and follow-up inspection services for firestop materials that is acceptable to the Owner.
  - 1. System Design Listing(s) for perimeter fire barrier joints and construction joints must meet movement requirements.
  - 2. Where fire rated construction joints are in areas that will be exposed, use sealants from Section 07920-Joint Sealants that have System Design Listing(s) for the particular application.
- C. Firestopping Subcontractor Qualifications:
  - 1. Acceptable firms shall be:
    - (a) Certified firestop installers acceptable to the firestop manufacturer. And

- (b) Licensed by the State of Florida or local authority where applicable. And 1 of the following:
    - (1) UL Qualified Contractor. OR
    - (2) FM Approved in accordance with FM Standard 4991. OR
    - (3) Shown to have successfully completed not less than 5 comparable scale projects.
- D. Fire safing insulation, fire and smoke barrier caulk, putty, fire barrier wrap/strips, fire prevention pillows, fire barrier partitions, fire barrier covers complete with necessary metal clips, supports, fastenings, and covers shall be tested in accordance with the ASTM standards in "References" above for floors, roofs, and fire walls with fire ratings as indicated on the drawings.
- E. Materials shall be listed in Directory of qualified testing agency-Through Penetration Fire Stops Systems and Fill Void or Cavity Materials.
- F. Manufacturer's Field Service: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's written instructions.
- G. Compatibility.
  - 1. Provide firestop systems that are compatible with one another, with the substrates forming openings, and with the items, under conditions of service and application, as demonstrated by manufacturer's testing and field experience.
  - 2. For penetrating involving CVPC piping, provide System Design Listing(s) that include materials that have been tested to be compatible with CVPV piping.
  - 3. Under normal environmental conditions, all materials used shall be non-corrosive to penetrant and assembly.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer.
- B. Store and handle firestopping materials in accordance with manufacturer's written instructions.
- C. Environmental Conditions: Install firestopping in accordance with manufacturer's written instructions.

## **1.7 PRE-INSTALLATION MEETING**

- A. Shall not occur without Shop Drawings approved by the Contractor and accepted by the Project Consultant. Shall convene a minimum of two weeks before starting work of this section.

- B. Required Attendees:
  1. Contractor.
  2. Firestopping subcontractor.
  3. Firestopping manufacturer.
  4. Installers of substrate construction to receive firestopping work.
  5. MEP subcontractors
  6. Gypsum board and masonry subcontractors.
  7. Any other subcontractors associated with work of this section.
  8. Architect.
  9. Owner's Project Manager.
  10. Owner's Maintenance Foreman.
  11. Building Department/BCI Representative.
  
- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.
  
- D. Agenda shall include:
  1. Review preparation and installation procedures and coordinating and scheduling required with related work.
  2. Review firestopping system requirements (drawings, specifications, and other contract documents).
  3. Review Shop Drawings and associated submittals.
  4. Review manufacturer's technical materials.
  5. Review and finalize construction schedule related to firestopping work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
  6. Review required inspection, testing, certifying and material usage accounting procedures.
  7. Tour representative areas, inspect and discuss condition of the substrate, and other preparatory work performed by other trades.

**1.8 SEQUENCING**

- A. Do not cover up firestopping installations until required inspections have occurred and installations are accepted by inspectors for each installation.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
  1. Grace Construction Products (Grace).
  2. IIG, LLC
  3. Rock Wool Manufacturing
  4. Roxul, Inc.
  5. Specified Technologies, Inc. (STI).
  6. Tremco, Inc.
  7. Thermafiber, LLC
  8. 3M Company

9. HILTI Corporation
- B. Substitutions:
  1. Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

## 2.2 MATERIALS

- A. Toxicity/IEQ: All firestop caulking and sealants are to comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda, California Department of Health Services or GREENGUARD™ Product Emission Standard for Children & Schools.
- B. All firestop caulking and sealants are to contain recycled content.
- C. Fire Safing Insulation: Where required by Systems Design Listing(s), install mineral fiber insulation by the following:
  1. Thermafiber LLC; Thermafiber Safing, FireSpan 90, or TopStop.
  2. Rock Wool Manufacturing: Delta Safing, Delta-CW4A, Delta CW8A, or Delta Deck Plugs.
  3. IIG, LLC: MinWool Safing, MinWoll Curtainwall.
  4. Roxul, Inc.: Roxul Safe or Roxul Curtain Rock.
- D. Fire and Smoke Barrier Caulk/Sealant:
  1. STI: LCI, SSS, LC, ES, PENSIL or SIL Sealants.
  2. Tremco: Fyre Caulk, Fyre Sil, IA+ or Acrylic.
  3. 3M Company: Fire Barrier CP 25WB+, IC 15WB+, 1000NS, 1003SL and 3000WT Sealants.
  4. Grace: FS 1900, FS 4000, and FS 900+.
- E. Firestop Spray:
  1. STI: AS200 or Fast Tack.
  2. Tremco: Acrylic Spray.
  3. 3M Company: FD Spray 200.
  4. Grace: FS 3000.
- F. Firestop Wrap Strip:
  1. STI: Spec Seal Series-RED, RED2, BLU2, SSW125, SSW250, SSW375, BLU220, BLU230 or BLU240 Wrap Strip.
  2. Tremco: TREMstop WS or Super Strap.
  3. 3M Company: Ultra GS or FS-195 Wrap Strip.
  4. Grace: FS Intumescent Wrap Strip.
- G. Firestop Putty and Putty Pads:
  1. STI: SSP Putty Pads or SSP Putty.
  2. Tremco: TREMstop MP or Putty.
  3. 3M: Modable Putty.
  4. Grace: FSP 1000 Putty or FSP 1077 Putty Pads.

- H. Fire Barrier Mortar
  - 1. STI: SSM Firestop Mortar.
  - 2. Tremco: TREMstop Fire Mortar.
  - 3. 3M Company: Fire Barrier Mortar.
  - 4. Grace: FSM 22 Mortar.
  
- I. Metal Restricting Collars: Use anchors per Systems Design Listing(s)
  - 1. STI: Spec Seal WRC, WRC2, WSC-8 or WSC-12.
  - 2. Tremco: MCR.
  - 3. 3M Company: RC-1 Restricting.
  - 4. Grace: FS Restricting Collar.
  
- J. Prefabricated Firestop Collar:
  - 1. STI: LCC, SSC or RTC Firestop Collars.
  - 2. Tremco: TREMstop D.
  - 3. 3M Company: Ultra PPD or Ultra RC Pack.
  - 4. Grace: FS Firestop Device or FS Intumescent Sleeve.
  - 5.
  
- K. Firestop Pillows: Meeting ASTM E814 requirements and classified by a qualified testing agency.
  - 1. **STI:** SSB Firestop Pillows.
  - 2. **3M Company:** Fire Barrier Pillows.
  - 3. **Grace:** FS Pillows.
  
- L. Hose Clamps for Restricting Collars: Standard galvanized steel or stainless steel hose clamps, as required by System Design Listing(s).
  
- M. Fire Rated Cable Pathways:
  - 1. STI: EZ-Path.
  
- N. Firestop Partitions and Covers:
  - 1. STI: SpecSeal Composite Sheet.
  - 2. 3M Company: CS 195+.
  
- O. Metal Supports for Firesafing "Packing Material", as required by System Design Listing(s).

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Notify the Contractor of any unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**



- A. Verify that system components are clean, dry and ready for installation.
- B. Verify that field dimensions are as shown on the Drawings, match System Design Listing(s), and as recommended by the firestop manufacturer.
- C. Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods.

### 3.3 APPLICATION

- A. Installing Through Penetration Firestop Systems:
  - 1. General: Comply with the System Design Listing(s) and firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
    - (a) Coordinate with other trades to assure that all pipes, conduit, cable and other items, which penetrate fire rated construction, have been permanently installed prior to the installation of the firestop assemblies.
    - (b) Schedule the work to assure that partitions and all other construction that conceals penetrations are not erected prior to the installation if firestop and smoke seals.
  - 2. Install forming/damming material and other accessories in accordance with manufacturer's installation instructions.
  - 3. Install fill material for through-penetration firestop systems by proven techniques to produce the following results:
    - (a) Completely fill voids cavities formed by opening, forming materials, accessories, and penetrating items.
    - (b) Install materials so they contact and adhere to substrates formed by openings and penetrating items.
    - (c) For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces.
- B. Installing Firestop Joint Systems
  - 1. General: Comply with the System Design Listing(s) and firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
    - (a) Install joint fillers to provide support of firestop materials during application and at the position required to produce the cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required. Use System Design Listing(s) for type, depth and compression of filler required.
  - 2. Install systems by proven techniques that result in firestop materials:
    - (a) Directly contacting and fully wetting joint substrates.
    - (b) Completely filling recesses provided for each joint configuration
    - (c) Providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capabilities.
    - (d) Refer to manufacturer's product data sheet for complete installation instructions of sealants, including requirements for primer, if necessary.

3. Tool non-sag firestop materials immediately after their application and prior to the time skinning begins. Form smooth, uniform beads or configuration indicated or required to:
  - (a) Produce fire-resistance rating.
  - (b) To eliminate air pockets.
  - (c) To ensure contact and adhesion with sides of joint.
- C. Installing Perimeter Fire Barrier Systems
  1. General: Comply with the System Design Listing(s) submitted as part of "1.4 SUBMITTALS" and firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
  2. Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials as applicable within the UL Classified Systems Design Listing.

### **3.4 FIELD QUALITY CONTROL**

- A. Inspection: Owner's BCI will examine penetration firestops, firestop joint systems and perimeter fire barrier systems and will determine that firestopping has been installed in compliance with requirements of System Design Listing(s) and firestop manufacturer's installations instructions.
- B. BCI shall notify contractor of any deficiencies noted.
- C. Do not conceal firestopping with other construction until BCI has verified that firestop installations comply with requirements.
- D. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and System Design Listing(s).

### **3.5 PROTECTION**

- A. Protect finished firestopping and fire retardant caulking from tears and punctures. Replace torn or pierced firestopping and caulking materials.

**END OF SECTION**

## SECTION 07600

### RA FLASHING AND SHEET METAL

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Flashing, counter-flashing, roofing grounds and nailers, and fabricated sheet metal items.

##### 1.2 RELATED SECTIONS

- A. Section 01572-Construction Waste Management.
- B. Section 06100-Carpentry.
- C. Section 07920-Joint Sealers.

##### 1.3 REFERENCES

- A. ANSI-SPRI/ES-1.
- B. American Society for Testing and Materials (ASTM):
  - 1. A 167-Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  - 2. B 32-Specification for Solder Metal.
  - 3. A 240-Heat-resisting Chromium and Chromium-nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
  - 4. D 2822-Standard Specification for Asphalt Roof Cement.
- C. Florida Building Code.
- D. Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ).
- E. (ISO) 14021 – 1999-Environmental Labels and Declarations
- F. National Roofing Contractors Association (NRCA) “Roofing and Waterproofing Manual” Detail for installation of units.
- G. Sheet Metal and Air-Conditioning Contractor’s National Association, Inc. (SMACNA): “Architectural Sheet Metal Manual”, latest Edition. Details for fabrication of units, including flanges and installation to coordinate with type of roofing indicated SUBMITTALS
- H. Properly identified product data and descriptive literature before starting work.
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

- (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
- (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

2 Regional Materials:

- (e) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
- (f) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- (g) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
- (h) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

I. Shop Drawings on flashing and sheet metal work.

J. Samples:

- 1. 8 inches square samples of specified sheet materials to be exposed as finished surfaces.
- 2. Samples of factory fabricated products exposed as finished work. Provide complete with specified factory finish.

**1.4 QUALITY ASSURANCE**

- A. Regulatory Requirements: Ensure flashing and sheet metal complies with requirements of Florida Building Code, NRCA, SMACNA, and ANSI-SPRI/ES-1.
- B. Coordinate application of flashings with application of roofing, protruding material, and roof accessories to provide a complete weather tight installation under provisions of the specified warranty requirements.
- C. All work shall be performed in accordance with referenced standards.

**1.5 PRE-INSTALLATION MEETING**

- A. Shall not occur without Shop Drawings approved by the Contractor and accepted by the A/E. Shall convene a minimum of two weeks before starting work of this section.
- B. Required Attendees:
  - 1. Contractor.

2. Subcontractor using materials in this section (ie: roofing, roofing equipment, doors, & windows).
  3. Roofing, roofing equipment, doors and window manufacturers.
  4. Installers of deck or substrate construction to receive roofing work.
  5. Installers of doors, windows, roof-top units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any).
  6. Any other subcontractors associated with work of this section.
  7. Architect.
  8. Owner's Project Manager.
  9. Owner's Maintenance Foreman.
  10. Building Department Representative.
- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.
- D. Agenda shall include:
1. Review preparation and installation procedures and coordinating and scheduling required with related work.
  2. Review roof, roof equipment, doors, and window system requirements (drawings, specifications, and other contract documents).
  3. Review Shop Drawings and associated submittals.
  4. Review manufacturer's technical materials.
  5. Review and finalize construction schedule related to work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
  6. Review required inspection, testing, certifying and material usage accounting procedures.
  7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary roofing.
  8. Tour representative areas of doors, windows, roofing substrates (decks), inspect and discuss condition of the substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.

## **1.6 SPECIAL WARRANTIES**

- A. By Membrane Producer: Provide a 20-year Special Warranty from the roof membrane producer covering correction of defects in the steel blocking and sheet metal component of Roof Assembly.
- B. By Steel Roof Blocking and Roofing Sheet Metal Producer and Installer: Provide a 10 year Special Warranty in which the SRB producer/installer agrees to correct defective SRB work.
1. See 07500 for full requirements of this Special Warranty that shall accompany the Roof Assembly Special Warranty.
  2. At time of project closeout, submit this signed Special Warranty to the roof membrane producer for transmittal to Contractor, A/E, and board.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. All manufactured flashing and sheet metal products are to contain recycled content.
- B. Sheet Material:
  - 1. Type 302 or 304 stainless steel, 24 gage, complying with ASTM A 167.
  - 2. Flashing for Pipes, Conduits, and Round Equipment Supports: Type 304 stainless steel, 26 gage, 2B, complying with ASTM A 240.
  - 3. Solder: Under provisions of ASTM B 32.
  - 4. Fastening Devices: Ensure fasteners are compatible with metal and roofing system. Use of powder-activated fasteners is prohibited.
    - (a) Where use of wood is approved in writing by the Owner for re-roofing:
      - (1) Attaching sheet metal to wood with concealed fastenings: Hot dip galvanized ring shank roofing nails not less than 1-1/4 inch long.
      - (2) Attaching sheet metal to wood with exposed fastenings: No. 10 x 1-1/4 inch pan head stainless steel sheet metal screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
    - (b) Attaching sheet metal to metal walkway covers: No. 10 x 1-1/4 inch pan head stainless steel sheet metal screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
    - (c) Attaching Sheet Metal to Masonry or Concrete: No. 10 x 1-1/4 inch pan head stainless steel masonry screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
  - 5. Roofing Cement: Plastic roofing cement complying with the requirements of ASTM D 2822 or as appropriate and as recommended by roofing manufacturer.

### **2.2 ACCESSORIES**

- A. Splash Blocks: Refer to Section 07631-Gutters and Downspouts
- B. Roof Drain Flashing: Minimum 4 pound per square foot, 36 inches x 36 inches lead flashing installed under provisions of the latest NRCA specifications.

### **2.3 FABRICATION**

- A. Fabricate flashing and sheet metal work under provisions of accepted shop drawings.
- B. Base Flashings at Metal Walkway Covers Abutting Concrete and Masonry:

1. Fabricate using sheet stainless steel to detail indicated, in not over 10 foot sections.
  2. Provide 2-inch minimum upturned wall flange behind counter-flashing.
  3. Where flutes are parallel to abutting wall, provide horizontal roof flange extending 2 inches on nearest flattop on roof decking.
  4. Where flutes abut wall, provide 2-inch roof flange.
- C. Cants:
1. Pre-fabricated 16 gage, galvanized, minimum 4 inch vertical height, formed at 45 degree angle to walls and parapets.
  2. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer (Basis of Design – BOD):
    - (a) Mfr: Concrecel USA; Product: ARBS (Alternative Roof Blocking System). Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
    - (b) Substitutions:
      - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
- D. Copings:
1. Fabricate in approximately 10-foot sections using sheet 24-gage stainless steel to detail as indicated.
  2. Provide a continuous 16-gage stainless steel outer hold-down cleat with punched holes at 6 inches on center and face fasten at inward facing parapet components with removable fasteners as required for sheet metal.
  3. Provide 8-inch wide joint covers.
  4. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer (Basis of Design – BOD):
    - (a) SBC Industries, North Miami, Florida. Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
    - (b) Substitutions:
      - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
- E. Curb to Duct Flashing and Counter Flashing:
1. Fabricate from stainless steel to fit duct curbs and ducts projecting from curbs.
  2. Provide 4-inch vertical flange to cover top edge of bituminous base flashings. Form flange bottom towards curb, with 1/4 inch bottom edge bent 1/4 inch out and hemmed.
  3. At top of curbs bend metal 90 degrees and extend horizontally over to duct, then bend upward and extend vertically not less than 3 inches from top edge of flashing out 3/8 inch to receive sealant.

4. Provide for field soldered lap joints at corners and 1-inch lap joints at horizontal miter splices.

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**NOTE TO SPECIFIER: Make selection in the following paragraph.**

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- F. Door Hoods: All unprotected exterior doors shall be furnished with door hoods.
  1. Size: \_\_\_\_h. by \_\_\_\_w. (as determined by Project Consultant)
  2. Fabricate using sheet stainless steel with closed ends to detail dimensions indicated.
  3. Lock seam top and side joints.
  4. Form 1-1/2 inch minimum continuous wall flanges at sides and top.
  5. Shop punch wall flanges for fastenings.
  6. Form 1-1/2 inch minimum horizontal inward stiffener flanges with hemmed edges at top bottom of hood.
  7. Lap bottom hood lips at corners, solder and secure with 2 stainless steel rivets each.

- G. Edge Drips:
  1. Fabricate using sheet 24 gage stainless steel drip edge to detail indicated, in not over 10 foot sections.
  2. Provide a continuous 16-gage galvanized continuous cleat with punched holes spaced as necessary. If cleat extends 6 inches or more below top fastener, provide second row of punched holes spaced as necessary.
  3. Provide 4 inch roof flange, and extend bottom drip not less than 1 inch below bottom of roof sheathing, with kick to dispel water 3/4 inch from finish wall.
  4. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer (Basis of Design – BOD):
    - (a) Mfr: Concrecel USA; Product: ARBS (Alternative Roof Blocking System). Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
    - (b) Substitutions:
      - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

- H. Pipes, Conduits, Wires, and Round Equipment Supports Penetrating Roofing or Resting on Roofing:
  1. Type 304 stainless steel, 26 gage, complying with ASTM A 240.
  2. Form tubular stainless steel sleeves sized to shape of penetration, not less than 8 inches above finished roofing with 4 inch wide base flange welded to water-tight to sleeve.
  3. Shop punch flanges.
  4. Seal flashing and cover with protective umbrella.
  5. Pre-manufactured roof penetration seals.



6. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer (Basis of Design – BOD):
  - (a) SBC Industries, North Miami, Florida. Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
  - (b) Substitutions:
    - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
  
- I. Sanitary Vent Stack Flashings:
  1. 4 pound per square foot lead flashing.
  2. Form tubular lead flashing sleeve not less than 8 inches high with a diameter 1/2 inch larger than the vent stack.
  3. Provide a 4-inch wide flange soldered water-tight.
  4. Provide vandal-proof vent covers.
  
- J. Scuppers:
  1. Fabricate using stainless steel to profiles and details shown.
  2. Lock seam corners, solder water-tight and hem outer exposed edges.
  3. Provide 4-inch wide minimum flanges formed to fit cants, decks and vertical wall surface.
  4. Shop punch flanges for fastenings at 6 inches on center.
  
- K. Stucco Stop with Counter-flashing (2-piece):
  1. Fabricate in approximately 10-foot sections using sheet stainless steel to detail as indicated.
  2. Provide receiver with 1-1/2 inch wall flange, 3/4-inch sloping stucco stop, and 3/4-inch flange bend downward with 1/2-inch hem.
  3. Shop punch wall flange for fastening.
  4. Provide shop fabricated soldered corner splices extending 4 inches each way.
  5. Provide counterflashing with 1-1/2 inch 45 degree top flange with 1/4-inch kick back at top and a 4-inch bottom flange formed inward 3/4 inch towards wall with a hemmed 1/2-inch kick at bottom.
  6. Provide 1-1/2 inch x 4-inch storm cleats.
  7. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer (Basis of Design – BOD):
    - (a) SBC Industries, North Miami, Florida. Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
    - (b) Substitutions:
      - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
  
- L. Stucco Stop with Counter-flashing (1-piece for re-roofing):

1. Fabricate in approximately 10-foot sections using sheet stainless steel to detail as indicated.
2. Provide counterflashing with 1/2 inch 45 degree leg for sealant with 1-1/2 inch wall flange with a 4-inch bottom flange formed inward 3/4 inch towards wall with a hemmed 1/2-inch kick at bottom.
3. Shop punch wall flange for fastening.
4. Provide shop fabricated soldered corner splices extending 4 inches each way.
5. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer (Basis of Design – BOD):
  - (a) SBC Industries, North Miami, Florida. Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
  - (b) Substitutions:
    - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

M. Surface Mounted Flashing (1-piece):

1. Fabricate in approximately 10-foot sections using sheet stainless steel to detail as indicated.
2. Provide flashing with 1-1/2 inch wall flange with 1/4-inch kick at top to receive sealant, a 1/2 inch 135 degree sloping top flange and a 4-inch bottom flange formed inward 3/4 inch towards wall with a hemmed 1/2-inch kick at bottom.
3. Shop punch wall flange for fastening to meet wind loads per FBC.
4. Provide shop fabricated corner splices extending 4 inches.
5. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturers (Basis of Design – BOD):
  - (a) SBC Industries, North Miami, Florida. Provide steel roof blocking (SRB) from a fabricator licensed by the ARBS patents holder.
  - (b) Substitutions:
    - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

N. Window Head Flashings:

1. Fabricate using sheet stainless steel to detail and dimension indicated.
2. Hem bottom drop edge.
3. Shop punch wall flange for fastenings.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

### **3.2 INSTALLATION**

- A. Lap, rivet, lock, or seal joints, as field conditions require.
- B. Provide necessary reinforcement, miscellaneous fittings, and accessories.
- C. Apply flashing and sheet metal work including miscellaneous fittings and accessories to even, smooth, sound, thoroughly clean and dry surfaces that are free from defects that might affect application. Prime metal flanges that receive bitumen under provisions of FBC and manufacturer's requirements.
- D. Perform soldering work slowly, with properly heated coppers to thoroughly heat seam material and sweat solder through full width of seam that shows no less than 1 inch of evenly flowed solder. Solder under provisions of ASTM B 32.
  - 1. Start soldering immediately after application of flux.
  - 2. Solder flat locked seam.
- E. Isolate dissimilar metals with accepted isolation paint or other accepted materials.
  - 1. Do not place in contact with nor in positions where drainage across such paint or other materials will occur.
- F. Make flashing and sheet metal work water and weather tight, with lines, arises and angles sharp and true and plane surfaces free from waves and buckles.
- G. Provide sufficient fasteners and related hardware to ensure a complete and weather tight system.
- H. Base Flashings at Aluminum Walkway Covers Abutting Concrete and Masonry:
  - 1. Set flashing tight against wall and with roof flange set on aluminum deck in bed of sealant.
  - 2. Secure roof flanges to metal deck with No. 10 x 1/2 inch stainless steel sheet metal screws at 6 inches on center maximum. Provide sealant washers and stainless steel washers under screw heads.
- I. Cants Strips: Install at transitions of roof membrane with flat vertical surfaces.
- J. Copings:
  - 1. Secure outer hold-down cleat to woodblock at 6 inches on center with ring shank roofing nails.
  - 2. Install coping over cleat. Allow 1/8-inch space between each coping section.
  - 3. Secure inside face of coping with removable grommet type fasteners.
  - 4. Provide 1 inch to 1-foot slope at coping to inner parapet wall.
  - 5. Install joint covers in full bed of sealant.

- K. Door Hoods:
1. Set hoods level over doors where required with wall flanges bedded in full bed of sealant.
  2. Secure hood wall flanges to wall with No. 10 x 3/4 inch stainless steel screws at 6 inches on center.
  3. Provide sealant washers and stainless steel washers under screw heads.
- L. Curb to Duct Flashing and Counterflashing:
1. Install flashings after ducts through curbs are in place and after bituminous base flashings are completed.
  2. Place flashings in place on curbs and solder corners and corner miter laps water-tight.
  3. Secure counter-flashings to vertical edge of curb nailers with No. 10 stainless steel sheet metal screws through sealant washers at not over 12 inches on center.
  4. Secure vertical upturned duct flashing to duct with No. 10 stainless steel sheet metal screws through sealants washers at not over 6 inches on center.
  5. Seal joint between flashings and ducts with sealant as specified in Section 07920.
- M. Edge Drips:
1. Install a continuous 20-gage stainless steel cleat.
  2. Set 24 gage stainless steel edge drip roof flanges in full bed of roofing cement over completed roofing.
  3. Lap splices 4 inches minimum and seal top horizontal surface laps with cold bitumen.
  4. Stagger nails at flange to roof deck at 4 inches on center.
  5. Cover roof flanges with 2-ply felt stripping set in full bed of roofing cement.
  6. Locate drip bottom not less than 3/4 inch away from finished vertical surfaces.
- N. Roof Drains:
1. Prime roof drain flanges before applying roof felts.
  2. Set lead in full bed of cold bitumen over intermediate plies or cap sheet.
  3. Strip lead cover with 2 layers of roofing felts in solid coats of hot bitumen.
- O. Roof penetration materials at all pipes, conduits and round equipment supports.
1. After preliminary examination install conical sealant cover with sealant.
- P. Sanitary Vent Stack Flashings:
1. Install under provisions of the latest NRCA specifications.
- Q. Scuppers:
1. Set scuppers in full bed of roofing cement over completed base flashing and roof membrane.

2. Secure to masonry walls and concrete decks with stainless sheet metal screws in lead shields at 6 inches on center.
  3. Secure to wood nailers with stainless steel sheet metal screws at 6 inches on center.
- R. Stucco Stop with Counterflashing (2-piece):
1. Set receiver on masonry and concrete walls where indicated.
  2. Lap splices 4 inches minimum and seal laps with sealant.
  3. Secure to wall with No. 10 x 1-1/4 inch minimum Tap-Con screws 12 inches on center maximum.
  4. Check for membrane/bitumen seal on top of felt flashing before counterflashing installation.
  5. Attach storm cleats at 30 inches on center and with 1 cleat at each joint.
  6. Insert counterflashing into receiver, and secure tightly with storm cleats.
- S. Surface Mounted Flashing (1-piece):
1. Set on masonry and concrete walls over base flashing where indicated.
  2. Lap splices 4 inches minimum and seal laps with sealant.
  3. Secure to wall with No. 10 x 1-1/4 inch Tap-Con pan head screws at 12 inches on center maximum. Provide neoprene sealant washers and stainless steel washers.
  4. Where corrugated metal wall occurs, place premolded neoprene filler strip on wall immediately above top of metal base flashing.
    - (a) Set filler strip in sealant and seal abutting edges of filler strip with sealant.
    - (b) Place counterflashing over filler strip set in sealant and secure flashing to metal wall through filler strip with No. 10 x appropriate length stainless steel sheet metal screws at 6 inches on center maximum and centered on wall flutes.
    - (c) Provide sealant washers and stainless steel washers under screw heads.
  5. Check for membrane/bitumen seal on top of felt flashing before flashing installation.
- T. Window Head Flashings:
1. Set wall flange in full bed of sealant over windows.
  2. Secure to prefinished wall panels with No. 10 x 3/4 inch pan head stainless steel sheet metal screws at 10 inches on center.
  3. Provide sealant washers and stainless steel washers under screw heads.

## END OF SECTION

## SECTION 07631

### RA GUTTERS AND DOWNSPOUTS

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Gutters, downspouts, conductor heads, scuppers, and splash blocks.

##### **1.2 REFERENCES**

- A. ANSI-SPRI/ES-1.
- B. ASTM A 167-Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- C. Florida Building Code.
- D. Sheet Metal and Air-Conditioning Contractor's National Association, Inc. (SMACNA): "Architectural Sheet Metal Manual", latest Edition. Details for fabrication of units, including flanges and installation to coordinate with type of roofing indicated.

##### **1.3 SUBMITTALS**

- A. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- B. Product Data: Provide data on prefabricated components.
- C. Samples: Submit 2 samples, full size, illustrating component design, finish, and configuration.

##### **1.4 QUALITY ASSURANCE**

- A. SMACNA "Architectural Sheet Metal Manual".
- B. Conform to applicable code for size and method of rain discharge.
- C. Stack preformed material to prevent twisting, bending or abrasion, and to provide ventilation. Slope to drain.
- D. Prevent contact with materials during storage, which may cause discoloration, staining or damage.
- E. Coordinate work with downspout discharge pipe inlet.
- F. Installation and design of system shall comply with the design pressures shown on the Contract Documents and the Florida Building Code.

- G. Regulatory Requirements: Ensure flashing and sheet metal complies with requirements of Florida Building Code, NRCA, SMACNA, and ANSI-SPRI/ES-1.
- H. Coordinate application of gutters and downspouts with application of roofing, protruding material, and roof accessories to provide a complete weather-tight installation under provisions of the specified warranty requirements.
- I. All work shall be performed in accordance with referenced standards.

## **1.5 SPECIAL WARRANTIES**

- A. By Membrane Producer: Provide a 20-year Special Warranty from the roof membrane producer covering correction of defects in the Gutters and Downspouts component of Roof Assembly.
- B. By Steel Roof Blocking and Roofing Sheet Metal Producer and Installer: Provide a 10 year Special Warranty in which the SRB producer/installer agrees to correct defective SRB work.
  - 1. See 07500 for full requirements of this Special Warranty that shall accompany the Roof Assembly Special Warranty.
  - 2. At time of project closeout, submit this signed Special Warranty to the roof membrane producer for transmittal to Contractor, A/E, and board.

## **PART 2 PRODUCTS**

### **2.1 PRODUCTS AND MATERIALS**

- A. Stainless Steel Sheet: Type 302 or 304 stainless steel, 24 gage complying with ASTM A167.
- B. Gutters: Profile as detailed on Drawings; stainless steel sheet.
- C. Conductor Head and Scuppers: Profile as detailed on Drawings; stainless steel sheet.
- D. Downspouts: Stainless Steel.
- E. Accessories: Profiled to suit headers and downspouts; stainless steel.
- F. Anchorage Devices: Type indicated on Drawings; stainless steel.
- G. Conductor Head and Downspout Supports: As indicated on Drawings; stainless steel.
- H. Fasteners: Stainless steel with soft neoprene washers.
- I. Protective Backing Paint: Zinc chromate alkyd.

### **2.2 ACCESSORIES**

- A. Splash Blocks: Approximately 2' 0" x 1' 6" x 1-1/2 inch thick reinforced concrete slabs with recess formed in top to deflect water away.

### **2.3 FABRICATION**

- A. Form headers and downspouts of profiles and sizes indicated on Drawings.
- B. Fabricate with required connection pieces.
- C. Form section square, true and accurate in size, and free of distortions and defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate header and downspout accessories, solder stainless steel sheet metal watertight.
- F. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Verify that surfaces are ready to receive work.

### **3.2 INSTALLATION**

- A. Install headers, downspouts, and accessories.
- B. Join lengths with formed seams soldered watertight. Flash and seal headers to downspouts.
- C. Solder metal joints watertight.
- D. Connect downspouts to downspout elbows. Seal connection watertight.

**END OF SECTION**



**SECTION 07920**  
**JOINT SEALANTS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Sealants and caulking for joints between dissimilar materials and to close other joints.

**1.2 REFERENCES**

- A. ASTM C 834-Standard Specification for Latex Sealants.
- B. ASTM C 919-Standard Practice for Use of Sealants in Acoustical Applications.
- C. ASTM C 920-Standard Specification for Elastomeric Joint Sealants.
- D. ASTM D 1056-Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
- E. GREENGUARD Product Emission Standard for Children & Schools.
- F. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- G. SWRI (Sealant, Waterproofing and Restoration Institute): Sealants: The Professional's Guide.

**1.3 SUBMITTALS**

- A. Product Data: Indicate chemical characteristics, performance criteria, limitations and color chart for all materials.
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
- B. Samples: Submit samples of each type of sealant and caulking.
- C. Submit manufacturer's installation instructions.

**1.4 QUALITY ASSURANCE**

- A. Single source responsibility: Obtain materials from a single manufacturer.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 3 years documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

**1.5 WARRANTY**

- A. Replace sealants and caulking which fails because of loss of cohesion or adhesion, or does not cure.
- B. Furnish written warranty that work executed under this section is free from defects of material and workmanship for a period of 5 years from date of substantial completion of the entire project.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- A. Toxicity/IEQ: All joint sealant materials are to comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
- B. Sealant Type 1:
  - 1. Polyurethane base, one-part, chemical curing.
  - 2. Non-sagging type for application in vertical joints.
  - 3. Capable of being immersed in water, withstand movement up to 25 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
  - 4. Shore A hardness: Minimum 15, maximum 50.
  - 5. Conforming to Requirements of ASTM C920 Type S Grade NS, Class 25, T, NT, O, M, G, I.
  - 6. Non-staining and non-bleeding.
  - 7. SWRI Sealant Validation.
  - 8. Color: Selected by Project Consultant.
- C. Sealant Type 2:
  - 1. Polyurethane base, two-part, chemical curing.
  - 2. Self-leveling type for application in horizontal joints.
  - 3. Capable of being continuously immersed in water, withstand movement of up to 25 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
  - 4. Uniform, homogenous, and free from lumps, skins, and coarse particles when mixed.
  - 5. Shore A hardness: Minimum 30; maximum 35.

6. Conforming to requirements of ASTM C920 Type M, Grade P, Class 25, Use T, NT, M, G, A, O, I.
7. Non-staining and non-bleeding.
8. Color: Selected by Project Consultant.

D. Sealant Type 3:

1. Polyurethane, two-part, chemical cure.
2. Non-sag type for vertical applications.
3. Capable of being continuously immersed in water; withstand movement up to 50 percent of joint width and satisfactory applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
4. Uniform, homogenous, and free from lumps, skins, and coarse particle when mixed.
5. Shore A hardness: Minimum 30, Maximum 40
6. Conforming to requirements of ASTM C920 Type M, Grade NS, Class 25 use T, NT, M, G, A, O.
7. Non-Staining and non-bleeding.
8. Color: Selected by Project Consultant.

E. Sealant Type 4

1. Acrylic base, one-part, solvent curing.
2. Capable of being continuously immersed in water, withstand movement up to 7-1/2 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
3. Shore A hardness: Maximum 55.
4. Non-staining and non-bleeding.
5. Conforming to requirements of ASTM C834.
6. Color: Selected by Project Consultant.

F. Sealant Type 5:

1. Silicone base, one-part, neutral curing.
2. Withstand movement up to 50 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
3. Shore A hardness: Maximum 30.
4. Conforming to requirements of ASTM C920, Type S, Grade NS, Class 50, US = NT, M, G, A. Selected by Project Consultant.
5. SWRI Sealant validation.
6. Color: Selected by Project Consultant.

G. Sealant Type 6:

1. Synthetic Butyl Rubber, one-part moisture cure.
2. Non-sag acoustical sealant.
3. Non-hardening, non-bleeding.
4. Unexposed joints only.

H. Sealant Type 7:

1. Silicone base, one-part moisture cure
2. Shore A hardness: 15

3. Conforming to requirements of ASTM C920 Type S, Grade NS, Class 100/50, Use T, NT, M, G. A and O.
  4. SWRI sealant validation.
  5. Color: Selected by Project consultant.
- I. Back-up Materials:
1. As recommended by caulking or sealant manufacturer and compatible with each material.
  2. Preformed material sized to require 25 percent to 50 percent compression upon insertion in joint.
  3. Do not use materials impregnated with oil, bitumen or similar materials.
- J. Bond Breakers: Where joints are not of sufficient depth to receive back-up material install polyethylene bond-breaking tape at back of joint.
- K. Primer:
1. As recommended by manufacturers of caulking or sealant used.
  2. Type that will seal the surfaces and prevent absorption of the vehicle essential to the retention of elasticity by the caulking or sealant compound.
- L. Accessories: Provide solvent, cleaning agents and other necessary materials as recommended by the caulking or sealant manufacturer essential for a complete installation.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Verify joint dimensions, physical and environmental conditions are acceptable to receive work of this Section.
- B. Verify that substrate surfaces and joint openings are ready to receive work.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Remove loose materials and foreign matter, which might impair adhesion of sealant.
- E. Clean and prime joint under provisions of manufacturer's instructions.
- F. Perform preparation under provisions of manufacturer's instructions.
- G. Protect elements surrounding work of this section from damage or disfiguration.

### **3.2 INSTALLATION**

- A. Perform work under provisions of ASTM C 804 for solvent release and ASTM C 790 for latex base sealants.
- B. Install sealant under provisions of manufacturer's instruction.
- C. Measure joint dimensions and size materials to achieve required width/depth ratios.
- D. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- E. Install sealant free of air pockets, foreign embedded matter, ridged and sags.
- F. Apply sealant within recommended temperature range. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Apply generally with caulking gun of proper nozzle size to fit joints.
- H. Apply with sufficient pressure to fill joint from backing to surface.
- I. For joints in flat surfaces, neatly tool compound slightly concave with proper tools.
- J. Execute finishing of caulking around frames with coving tool.
- K. As work progresses, immediately remove compound that may accidentally flow onto adjoining surfaces using manufacturer's recommended solvent and cleaners. Remove excess material from joints immediately.
- L. At completion, carefully check all joints for damage and repair-damaged joints.
- M. Clean adjoining surfaces.
- N. Protect sealants and caulking until cured.

### **3.3 SCHEDULES**

- A. Exterior:
  - 1. Perimeters of exterior openings where frames meet exterior facade of building: Type 1 or 3.
  - 2. Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Type 1 or 3.
  - 3. Expansion and control joints in exterior surfaces of pre-cast tilt-up wall panels: Type 7 (unpaintable) or Type 3 (paintable polyurethane).
  - 4. Exterior joints in horizontal wearing surfaces: Type 2 in areas subject to foot and vehicular traffic; Type 3 at plazas, malls, patios etc.
  - 5. Skylights and glazing: Type 5.
- B. Interior:
  - 1. Seal interior perimeters of exterior openings: Type 1.

2. Expansion and control joints in interior surfaces of poured-in-place concrete walls: Type 1 or Type 3.
3. Expansion and control joints in interior surfaces of pre-cast tilt-up wall panels: Type 1 or Type 3.
4. Interior control and expansion joints in floor surfaces: Type 1 or Type 2.
5. Perimeters of interior frames: Type 1.
6. Perimeters of bath fixtures: Type 4.
7. Exposed interior control joints in drywall: Type 4.
8. Control joints in drywall, perimeter, and between metal framing and substrate in sound rated partitions: Type 6.

**END OF SECTION**

## SECTION 08110

### STEEL DOORS AND FRAMES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Fire rated and non-fire rated standard steel doors and steel frames and steel windows frames and associated accessories that are indicated on the drawings and in schedules.
- B. Section Does Not Include: Use of aluminum doors.

##### 1.2 RELATED SECTIONS

- 1. 01572-Construction Waste Management.
- 2. 04200-Concrete Unit Masonry.
- 3. 06100-Carpentry.
- 4. 07900-Joint Sealers.
- 5. 08710-Door Hardware.
- 6. 08800-Glass and Glazing.
- 7. 09250-Gypsum Drywall.
- 8. 09900-Painting.

##### 1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. A1011A/1011/M-Specifications for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High Strength Low-Alloy with improved Formability.
  - 2. A653/A653/M-Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed by the Hot Dipped Process (Commercial Steel).
  - 3. A1008/A1008/M-Specification for Steel Sheet and Strip, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength, Low-Alloy with Improved Formability.
  - 4. C270-Mortar for Unit Masonry.
  - 5. E 152-Fire Test of Door Assemblies.
- B. ANSI/NAAMM HMMA 861-Guide Specifications for Commercial Hollow Metal Doors and Frames.
  - 1. ANSI=American National Standards Institute.
  - 2. NAAMM=National Association of Architectural Metal Manufacturers.
  - 3. HMMA=Hollow Metal Manufacturers Association.
- C. ANSI/SDI A250.8-Recommended Specifications for Standard Steel Doors and Frames.
  - 1. SDI=Steel Door Institute.
- D. Factory Mutual (FM).
- E. Florida Building Code (FBC).

- F. Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).
- G. International Organization for Standardization (ISO) 14021–1999; Environmental Labels and Declarations.
- H. National Builders Hardware Association-“Recommended Locations for Builder’s Hardware”.
- I. National Fenestration Rating Council (NFRC).
- J. NFPA 80-Fire Doors and Windows (National Fire Protection Association).
- K. NFPA 252-Standard Methods of Fire Tests of Door Assemblies.
- L. Underwriters Laboratories (UL).

#### **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer’s technical product data substantiating that products comply with requirements prior to start of manufacture.
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  - 2. Energy Efficiency:
    - (a) Submit product data indicating energy performance in accordance with the National Fenestration Rating Council (NFRC) methodology.
  - 3. Manufacturer’s specifications and catalog cuts.
- B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, required reinforcement, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door hardware and reinforcements, details of joints and connections. Show anchorage and accessory items. Show allowable design pressures and impact resistance certification for doors exposed to wind loading.
  - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
  - 2. Indicate coordination of glazing frames and stops with glass and glazing requirements.
  - 3. Doors and frames shall meet or exceed wind pressure and impact requirements shown on Contract Documents.
- C. Label Construction Certification: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer’s



certification for each door and frame assembly constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

- D. Samples: Provide cut-away samples of hollow metal door and frame construction. Submit for review 1 foot 6 inches x 1 foot 6 inches portion of exterior flush door panel construction at upper hinge corner location. Sample to include actual thickness and gages of face sheets, channels, reinforcing plates, insulation, etc. Sample to be prime painted. Submit for review 1-foot long lower portion of exterior hinge side frame construction. Sample to include actual gage thickness of jamb sheet metal, reinforcing plates and floor anchors. Supply sample of expansion anchor fasteners. Jamb sample to be prime painted.
- E. Exterior Doors: Submit complete current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

### **1.5 QUALITY ASSURANCE**

- A. Provide doors and frames complying with ANSI/SDI 250.8 for Standard doors and ANSI/NAAMM HMMA 861 for custom doors.
- B. Fire-Rated Door Assemblies: Where fire rated door assemblies are indicated or required, provide fire-rated door and frame assemblies complying with NFPA 80 and have been tested, listed, and labeled according to ASTM E152 by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
- C. Provide factory applied metal labels on fire-rated doors and frames. Field applied labels shall not be acceptable.
- D. The Owner reserves the right to select at random up to 2 doors and frames to verify the construction for compliance with this specification. Cost of replacement of these two doors and frames shall be included in the Contract Amount, and entered in the Schedule of Values as a separate line item.
- E. All work shall be performed in accordance with referenced standards.

### **1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver steel doors and frames cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory-finished doors.
- B. Inspect steel doors and frames upon delivery for damage. Minor damage may be repaired if refinished items are equal in all respects to new work and acceptable to owner. Remove and replace damaged items as directed.
- C. Doors and frames shall be stored at the building site under cover in a vertical position. Doors and frames shall be separated and spaced using wood blocking. Place units on minimum 4 inch high wood blocking. Avoid use of non-vented plastic or canvas shelters that could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4 inch spaces between stacked doors to promote air circulation.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURES**

- A. Manufacturers are accepted upon certification that all requirements of this specification are met.

### **2.2 MATERIALS**

- A. All Steel door and frame materials to contain recycled content.

### **2.3 HOLLOW METAL DOORS AND TRANSOMS**

- A. Fabricate exterior doors of 16 gage and interior doors of 18 gage bonderized hot-dip zinc coated steel in accordance with ASTM A653, galvaneal with a coating weight A60 for all doors.
- B. Types: Custom type, flush, seamless hollow construction with louvers or vision cutouts as shown or specified.
  - 1. Refer to Section 08710-Door Hardware for mounting heights of hardware.
- C. Sizes and Thickness: Sizes shall be as indicated, and thickness shall be 1-3/4 inches unless otherwise specified or shown.
- D. Door Perimeters:
  - 1. Stile Edges:
    - (a) Reinforce stile edges full height with 16 gage bonderized zinc coated steel channels. Seams shall be continuously welded and ground smooth. Fill and sand depressions.
    - (b) Reinforce door edge at each hinge location with minimum 7-gage steel hinge reinforcement.
    - (c) Vertical Edges of Single Acting Doors: Bevel 1/8 inches in 2 inches.
  - 2. Door Tops:
    - (a) Reinforce door tops with full width, 16 gage, bonderized, zinc coated, continuous, recessed steel channels, spot-welded to face sheets.
    - (b) All exterior door tops shall have flush, full width, 16 gage, bonderized, zinc coated steel filler channel. Seams shall be welded and ground smooth. Fill and sand depressions to assure watertight.
  - 3. Door Bottoms:
    - (a) Reinforce door bottoms with full width 16 gage bonderized zinc coated steel channels, spot welded to face sheets.
    - (b) Provide three 1/8-inch diameter weep holes in bottom channel of exterior doors.
- E. Stiffeners: Provide 22 gage "Z" or high hat shaped vertical members spaced not more than 6 inches o.c. with welds 5-inch o.c. maximum.
- F. Core Fill: Mineral wool batt fiberglass blanket insulation. Pack insulation tight in all door panel cavities.

- G. Sound-Control Door Assemblies: Provide acoustical hollow metal door and frame assemblies for walls and partitions with STC ratings of 48 or more.
- H. Hardware Reinforcements:
  - 1. Mortise and reinforce as indicated on the Drawings, in this Section and as follows:
    - (a) Drill/tap for mortised hardware according to accepted door hardware schedule and templates furnished by hardware supplier.
    - (b) Drilling and tapping for surface applied hardware shall be done in the field.
    - (c) Locate door hardware according to "Recommended Locations for Builder's Hardware," published by National Builders Hardware Association or as directed in Section 08710-Door Hardware.
    - (d) All door closers shall be through bolted with sex bolts.
  - 2. Butt (Hinge) reinforcing: Steel plate 3/16 inch (7 gage) thick by 1-1/2 inch wide by 10 inches long. Offset and secured by not less than six spot welds.
- I. Light Opening in Doors:
  - 1. Provide light openings of sizes indicated.
  - 2. At light opening cut outs, provide 16 gage zinc coated steel channel closures welded into opening perimeter installed at factory.
  - 3. At light opening cut outs, provide 18 gage bonderized zinc coated steel channel type stops tightly fitted to opening, with square and true butt joints.
    - (a) Drill and dimple countersink stops for fastenings. Provide zinc plated No. 6 oval head screws into opening frames at not over 12 inches o.c.
    - (b) Exterior stops shall be integral with opening frame, integral with door or welded in place.
  - 4. At exterior doors caulk perimeter seam between closure channel and door face sheet with grade exterior sealant prior to finish painting.
  - 5. All light openings shall be cut, reinforced and stops applied in the shop. No field cutting of the doors.
- J. Louvers: Louvers shall be 18 gage, galvanized, inverted Y blades with mitered weld corners and counter sunk mounting holes with fasteners. Finish shall be manufactures standard prime paint or baked on enamel.

## 2.4 DOOR FRAMES

- A. Fabricate exterior and interior frames to profiles indicated of 14 gage base metal thickness for all frames, bonderized hot-dip zinc coated sheet steel in accordance with ASTM A653, galvanealed with a coating weight of A60 for all frames.
- B. Types: Custom type, fully welded and ground smooth and flush, with faces mitered, and stops butted. Head and jamb members with integral stops and with combination buck and trim as shown. Knocked-down (KD) frames are not acceptable.
  - 1. Corners shall have continuous flush and smooth welds without dishing.
  - 2. Minimum stop depth shall be 5/8 inch.

3. Refer to Section 08710-Door Hardware for mounting heights of hardware.
- C. Hardware Reinforcements and Preparations:
1. Frames shall be mortised, reinforced, and drilled/tapped for mortised hardware according to approved door hardware schedule and templates by hardware supplier.
    - (a) Drilling and tapping for surface applied hardware shall be done in the field.
    - (b) Locate door hardware according to "Recommended Locations for Builder's Hardware" published by National Builders Hardware Association or as directed in section 08710-Door Hardware.
  2. Butt (Hinge) Reinforcing:
    - (a) Top Hinge: Steel plate 3/16 inch thick (7 gage) by full width of jamb by 10 inches long, offset as required to have faces of butts flush with doorframe edge and secured by not less than 12 spot welds.
    - (b) Other Hinges: Steel plate 3/16 inch thick (7 gage) by 1-1/4 minimum by 10 inches long, offset as required to have faces of butts flush with doorframe edge and secured by not less than 12 spot welds.
  3. Strike Reinforcement: Offset clips of 12-gage steel, 1-1/2 inch x 3/4 inches longer than strike top and bottom.
  4. Closer Shoe Reinforcing:
    - (a) 10 gage steel plates (minimum 14 inches long) width of stop near corner of hinge jamb.
    - (b) Provide styrofoam or treated wood over plates to allow closer foot screws to seat without interference from grout fill.
- D. Silencer (Mute) Provisions: Punch frames to receive silencers on strike jamb (except in weather stripped frames) scheduled in Section 08710-Door Hardware. Provide 3 silencers for single door and 2 silencers for each leaf in pair of doors at head of frame. Install silencers before grouting.
- E. Grout Guards at Grouted Frames (refer to article 3.2-Installation below for locations): Provide at masonry openings only; 26 gage sheet metal covers welded to the back of frames at hinges, lock, bolts, tapped reinforcements at hardware.
- F. Jamb Anchors for Masonry:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
- G. Jamb Anchors for Cast-In-Place Concrete:
1. Provide "Hat" sections or "pipe spacers" standard to the manufacturer.
  2. Provide at least three anchors up to 7 feet 6 inches high opening and one anchor for each additional 30 inches of opening height or part thereof for both strike and hinge jambs.
  3. Provide complete with minimum 3/8-inch diameter cadmium plated flush head screw complete with expansion anchors.
- H. Jamb Anchors for Drywall Stud Partitions.

1. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
- I. Floor Anchors: Provide 14 gage galvanized sheet steel angle shaped anchors for each jamb extending to the floor, punched for not less than two 3/16 inches diameter cadmium plated bolts and washers each side. Shim anchors to slab with nylon shims.
  - J. Spreaders: Provide frames with temporary steel spreader bars tack welded to jambs to maintain full rigidity and proper alignment during installation.
  - K. Security Switch Preparation: Refer to the Drawings.

## **2.5 FINISHING AND SHOP PAINTING**

- A. After Fabrication: Grind exposed weld marks smooth and flush, clean and degrease surfaces, apply metallic filler, sand smooth, and apply shop coat of manufacturer's standard zinc-rich rust-inhibitive metal primer baked on.
- B. Prime Coat: Thoroughly cover all surfaces to provide uniform dry film thickness of not less than 1.0 mil without runs, smears, or bare spots. Do not paint over fire rating labels.
- C. Primer Coat: Use manufacturer's standard rust inhibiting primer complying with ANSI A210.10

## **2.6 ACCESSORIES**

- A. Grout: Provide a mortar mix complying with ASTM C270a, Type S-1800-psi minimum.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

### **3.2 INSTALLATION**

- A. Frames:
  1. Install plumb, level, and true to line, secured in openings.
  2. Install frames according to accepted shop drawings, manufacturer's printed instructions.
  3. Fill door frames with grout (jambs and head) at concrete block and masonry walls exterior and interior.
  4. Install fire-rated frames according to NFPA 80.
  5. Fill surface depressions of hollow metal frames with metallic paste filler and grind smooth to finish.
  6. Finish paint frames prior to hardware installation. Do not paint over fire rating labels.

- B. Doors:
  - 1. Install in openings plumb, level, and true to line.
  - 2. Apply hardware and adjust to achieve smooth and quiet operation.
  - 3. Install insect/rat screens on interior of exterior door louvers. At exterior doors, caulk perimeter seam between closure channel and doorframe sheet with paint grade exterior sealant, prior to finish paint.
  - 4. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.
  - 5. Finish paint doors prior to hardware installation. Do not paint over fire rating labels.

### **3.3 ADJUST AND CLEAN**

- A. Prime Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective plastic wrappings from prefinished doors.
- C. Final Adjustments: Check and readjust operating door hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition. Provide final adjustment as follows:
  - 1. Door Contact with Silencers: Doors shall strike a minimum of two silencers without binding lock or latch bolts in the strike plate.
  - 2. Head, Strike, and Hinge Jamb Margin: 1/8 inch.
  - 3. Meeting Edge Clearance, Pairs of Doors: 1/8 inch.
  - 4. Bolts and Screws: Leave tight and firmly seated.
  - 5. Soundseal gasketing: Full contact with no gaps.
  - 6. Vermin Protection:
    - (a) Drop Seal: Full contact with no gaps.
    - (b) Brush weatherstripping: Full contact.

**END OF SECTION**

## SECTION 08210

### FLUSH WOOD DOORS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Solid core, fire-rated and non-rated flush wood doors.

##### 1.2 RELATED SECTIONS

- A. 01572-Construction Waste Management
- B. 08110-Steel Door Frames: Refer for metal door frames for flush wood doors.
- C. 08710-Door Hardware.
- D. 08800-Glass and Glazing.

##### 1.3 REFERENCES

- A. ASTM - American Society for Materials and Testing
  - 1. D600-Determination of Formaldehyde Concentration in Air from Wood Products.
  - 2. D6330-Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels.
- B. FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- C. GREENGUARD Product Emission Standard for Children & Schools.
- D. Intertek Testing Service (ITS)-Warnock Hersey (WH).
- E. National Fire Protection Association (NFPA).
- F. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- G. Underwriters Laboratory (UL).
- H. Window and Door Manufacturers Association (WDMA).

##### 1.4 SUBMITTALS

- A. Product Data: Submit door manufacturer's technical data for each type of flush wood door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications if applicable.
  - 1. Low Emitting Materials:
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.

- (b) Submit manufacturer's certification that all products comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
- 2. Sustainable Forestry:
  - (a) Forest Stewardship Council (FSC): Provide Chain-of-custody certificates certifying compliance with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
  - (b) Submit copies of invoices indicating cost data and the FSC certification numbers for each product.
  - (c) Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.
- B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extend of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.
- C. Samples: Submit samples, 1 foot square or as indicated, for the following:
  - 1. Doors: Door faces with solid wood edging representing typical range of color and grain for veneer and solid lumber required.
- D. Manufacturer's Full Lifetime Warranty

## **1.5 REGULATORY REQUIREMENTS**

- A. Conform to all applicable codes for fire rated doors.

## **1.6 QUALITY ASSURANCE**

- A. Quality Standards: Comply with the following standards:
  - 1. WDMA I.S. 1-A.
- B. Fire-rated Wood Doors: Comply with NFPA-80. Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM E152 and which are labeled and listed for ratings indicated by UL, ITS-WH or other testing and inspection agency acceptable to authorities having jurisdiction. Provide metal labels mechanically fastened to door. Do not finish paint over labels.
- C. The Owner reserves the right to select at random up to 2 doors to verify the construction for compliance with this specification. Cost of replacement of these 2 doors and frames shall be included in the Contract Amount, and entered in the Schedule of Values as a separate line item.
- D. Manufacturer: Obtain doors from a single manufacturer.
- E. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."



- F. Engineered Wood Products:
  - 1. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
  - 2. Determine Volatile Organic Compounds (VOC), excluding formaldehyde, emitted from manufactured wood-based panels in accordance with ASTM D6330.

## **1.7 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of WDMA pamphlet “How to Store, Handle, Finish, Install, and Maintain Wood Doors”, as well as with manufacturer’s instructions.
- B. Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames and hardware, using temporary, removable or concealed markings.
- C. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with referenced WDMA quality standards, applicable to Project’s location.

## **1.8 WARRANTY**

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
- B. Door Manufacturer’s Warranty: Submit written agreement on door manufacturer’s standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.
  - 1. Warranty: Include reinstallation, which may be required to repair, or replacement of defective doors where defect was not apparent prior to hanging.
  - 2. Warranty: In effect for life of installation (as standard with manufacturer) after date of Substantial Completion.
- C. Contractor’s Responsibility: Replace or refinish doors where Contractor’s work contributed to rejection or to voiding of manufacturer’s warranty.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with specified requirements, provide doors from one of the following:
  - 1. Algoma Hardwoods Inc.
  - 2. Eggers Industries.
  - 3. Lambton Doors.

- 4. Marshfield Door Systems Inc.
- B. Substitutions:
  - 1. Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedure.

## **2.2 MATERIALS**

- A. Toxicity/IEQ: All engineered wood products are to comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.

## **2.3 INTERIOR NON-FIRE-RATED DOORS**

- A. All wood door products shall comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. All engineered wood door products containing composite and particleboard materials shall comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
- C. Performance Duty Level: Extra Heavy Duty.
- D. Aesthetic Grade: Premium.
- E. Door Construction: Five ply (face veneer and crossband glued to each side of core), bonding using hot press method.
- F. Core Material (Solid Core Doors):
  - 1. PC-5 FSC UFF PB (FSC Certified, Urea-Formaldehyde Free, Particleboard). Comply with ANSI Standard. A208.1 LD-2, with screw holding power of 125 lbs.
  - 2. Hot pressed only.
- G. Stiles (Vertical Edges): Hardwood to match face veneer. Veneered edges are not acceptable.
- H. Rails (Horizontal Edges): Hardwood or structural composite lumber.
- I. Adhesives: Type I, Waterproof.
- J. Factory Seal: Seal top and bottoms when factory finished.
- K. Cross Banding: Wood-based composites of a minimum thickness of 1/16 inch. Crossband and face veneers are laminated to the core with interior use adhesive using hot press process. Crossbands must extend the full width of the door.
- L. Veneer:

1. Face Grade: A.
2. Veneer Cut: Rotary Cut.
3. Veneer Species:
  - (a) Stain Grade (provide factory stain finish): White Birch.
4. Veneer Matching: Book Match.
5. Assembly of Spliced Veneers: Running book match.

## **2.4 INTERIOR FIRE-RATED SOLID CORE DOORS**

- A. Provide faces and grade to match non-rated doors in same area of building, unless otherwise indicated. Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
  1. Pairs: Furnished formed steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated.
  2. Mineral Fiber Core: If this core is used, provide non-combustible inner blocking for all surface applied hardware, through-bolts are not acceptable.

## **2.5 LOUVERS AND LIGHT FRAMES**

- A. Metal Louvers: Size, type and profile shown and fabricated from the following:
  1. Natural Aluminum: Extruded aluminum with natural anodized finish complying with AA-C22A31, Class II.
- B. Light Openings in Doors: Manufacturer's standard metal frame for flush glazing, factory-primed. Frames in non-fire rated doors shall match approved frames in fire-rated doors.

## **2.6 FABRICATION**

- A. Fabricate flush wood doors in sizes indicated for job-site fitting complying with following requirements:
  1. Fixed Transom Panels: Fabricate matching panels with the same configuration, exposed surface and finish as specified for associated doors.
  2. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.
    - (a) Light Openings:
      - (1) Trim openings with moldings of material and profile indicated.
      - (2) Flush Glazing.
  3. Louvers: Factory install in prepared openings.
  4. Glazing: Field install per provisions of Section 08800-Glass and Glazing.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine installed door frames prior to hanging door:

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
  2. Do not install doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Hardware: For installation see Section "Finish Hardware", of these specifications.
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced WDMA standard and as indicated.
- C. Install fire-rated doors in corresponding fire-rated frames under provisions of requirements of NFPA No. 80.
- D. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Sand and seal (2 coats) cut surfaces after fitting and machining.
1. Fitting Clearances for Non-Rated Doors: Provide 1/8 inch at jambs and heads; 1/16 inch per leaf at meeting stiles for pairs of doors; and 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.
  2. Contractor responsible for determining overall thickness of decorative floor finish or covering.
  3. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
  4. Bevel non-rated doors 1/8 inch in 2 inch at lock and hinge edges.
  5. Bevel fire-rated doors 1/8 inch in 2 inch in lock edge; trim stiles and rails only to extend permitted by labeling agency.
- E. Field Finished Doors: Refer to Section 09910-Paints and Coatings, for finishing requirements. Doors shall be primed and finish painted prior to installation of any door hardware. Metal frames for door lights shall be primed and finish painted prior to installation of glass and glazing tape.
- F. Door Protection: All Doors are to be Poly Bagged. Poly bags to remain on factory finished doors until final inspection.
- G. Operation: Rehang or replace doors, which do not swing or operate freely.
- H. Protect doors as recommended by door manufacturer to assure that wood doors will be without damage or deterioration at time of Substantial Completion.

### **END OF SECTION**

## SECTION 08400

### ENTRANCES & STOREFRONTS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Aluminum storefront frames, storefront doors, and vision glass infill panels.

##### 1.2 RELATED SECTIONS

- A. 01572-Construction Waste Management.
- B. 07920-Joint Sealants.
- C. 08710-Door Hardware.
- D. 08800-Glass and Glazing.

##### 1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA).
  - 1. AAMA 2605-Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- B. ASTM D1730-Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
- C. Florida Building Code (FBC).
- D. International Organization for Standardization (ISO) 14021 – 1999; Environmental Labels and Declarations
- E. National Association of Architectural Metal Manufacturers (NAAMM).
- F. National Fenestration Rating Council (NFRC)

##### 1.4 SUBMITTALS

- A. Product Data:
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  - 2. Energy Efficiency:

- (a) Submit product data indicating entrance and storefront Solar Heat Gain Coefficient (SHGC) and Visible Light Transmittance (VT) in accordance with the National Fenestration Rating Council (NFRC) methodology.
  - 3. Manufacturer's specifications and catalog cuts.
- B Shop Drawings
  - 3. Shop Drawings required, covering each type door, frame, condition, anchoring detail and finishes. Provide test reports and structural calculations.
    - (a) Shop drawings shall conform to maximum allowable design pressures per the Florida Building Code.
- C Samples:
  - 1. Aluminum and color finish including metal materials, glass, and glazing gaskets.
  - 2. Sealants: Provide manufacturer color chart and sample for selection by Project Consultant.
- D. Manufacture installation instructions: Indicate special procedures and conditions requiring special attention.
- E. Warranty.
- F. Complete current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

## **1.5 QUALITY ASSURANCE**

- A. Design Requirements: Design exterior storefront systems to conform to the Florida Building Code and meet the design pressures shown on Contract Documents and meet the Impact Standards, in compliance with Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA) or Florida statewide product approval.
- B. Labeling: Each unit shall bear a permanent label with manufacturer's name or logo, city, and state.
- C. All work shall be performed in accordance with referenced standards.

## **1.6 DELIVERY, STORAGE and HANDLING**

- A. Deliver storefront components to project site in manufacturer's fully identified containers.
- B. Store in accordance with manufacturer's published instructions, above grade on dunnage, properly protected from weather and construction activities.

## **1.7 WARRANTY**

- A. Submit written warranty, signed jointly by manufacturer, installer and Contractor, agreeing to replace aluminum window units, which fail in materials or installations within 3 years of date of acceptance. The 3 parties

jointly and separately are responsible for the installation for the period stated herein.

- B. Failure of materials or installation: include, but not be limited to, excessive leakage or air infiltration, excessive deflections, faulty operation, deterioration of finish or metal in excess or normal weathering and defects in hardware and weather-stripped.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURER**

- A. Subject to compliance with specified requirements, provide storefronts from the following:
  - 1. Kawneer, Series: IR500 Frames, IR350 Doors.
  - 2. United States Aluminum, Series: IG 500.
  - 3. Vistawall Architectural Products, Series: 5000.
  - 4. YKK Architectural Products, Series: YHS 50 FS.
- B. Substitutions:
  - 1. Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedure.

### **2.2 MATERIALS**

- A. All entrance and storefront materials to contain recycled materials.
- B. Aluminum framed storefront frames and doors (impact rated system for exterior use): Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage, and attachment devices. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Basic Materials:
  - 1. Extrusions: AA-6063 T-6 aluminum alloy.
  - 2. Surface: Free of scratches and blemishes.
- D. Frames:
  - 1. Storefront: Flush glazed, aluminum storefront sections; 2-1/2 inch wide x 5 inches deep. Provide sections as detailed on Drawings.
- E. Doors:
  - 1. Type: Wide Stile, modified as follows:
    - (a) Stiles: 5 inch (nominal) minimum width.
    - (b) Top rail: 5 inches (nominal) minimum.
    - (c) Center rail (optional only when center rail is not part of the NOA).
    - (d) Bottom rail: 6-1/2 inches nominal.
  - 2. Corners: Weld or mechanically fasten.
- F. Glass:

1. At Exterior Conditions: Refer to Section 08800-Glazing for Exterior Glass.
    - (a)
  2. At Interior Conditions: Clear glass, tempered in compliance with FBC.
- G. Glazing Stops:
1. Snap-in type with neoprene bulb-type glazing gasket. No exposed screws allowed.
  2. Stops: As shown on drawings.
- H. Fasteners: Aluminum, stainless steel or zinc plated steel. Properly insulate steel anchors from aluminum.
- I. Hardware:
- J. Hardware for aluminum entrance doors must comply with current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA), furnish hardware to the door manufacturer for installation at the factory.
1. Finish Hardware Supplier: Responsible for furnishing physical hardware, and templates of all specialty hardware, to the entrance manufacturer prior to fabrication, and for coordinating hardware delivery requirements with the hardware manufacturer, the contractor and the entrance manufacturer.
  2. Provide manufacturer's standard aluminum reinforcing back-up plates for all hinges and hardware as required.
- K. Accessories:
1. Provide all fasteners, anchors, sections, etc. for a complete installation of all items specified herein.

## **2.3 FINISH ON ALUMINUM**

- A. Class-I Clear Anodic: AA-M12C22A41, minimum 0.7 mils.
- (a) Texture: Satin
  - (b) Reference Standard: AAMA 2605 with a chrome phosphate pretreatment, Superior Performance Organic Coating.
  - (c) Color: As selected by Project Consultant w/Owner approval.
  - (d) Product: Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
    - (1) Hylar 5000, by Austimont USA.
    - (2) Kynar 500, by Atochem North America.
    - (3) Megaflox, by PPG.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Clean aluminum surfaces and treat following ASTM D1730, Type B, Method 5 or 7.



- B. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface and are under provisions of approved shop drawings.

### **3.2 INSTALLATION**

- A. Install windows under provisions of Section 08800-Glass and Glazing and manufacturer's printed instructions, accepted shop drawings, under direct supervision of manufacturer's representative(s), and current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).
- B. Use only skilled tradesmen, erect all storefront components to all building bench marks and column centerlines.
- C. Plumb and align storefront faces in a single plane for each wall plane and erect materials square and true adequately anchored to maintain positions permanently when subjected to normal thermal and building movement and specified wind loads.
- D. Separate aluminum from masonry and ferrous metals by use of bituminous coating or gasketing to eliminate possibility of corrosion from electrolytic action.
- E. Protect work from corrosion, prime coat concealed steel stiffeners, anchors, brackets, fasteners and the like prior to installation and seal joints between window frames and building tightly and continuously.
- F. Furnish and apply sealants to provide a weathertight installation at all joints and intersections and at opening perimeters. Wipe off excess material; leave all exposed surfaces and joints clean and smooth.
- G. Cleaning:
  - 1. Clean surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes.
  - 2. Remove excess glazing and sealant compounds, dirt and other substances.
  - 3. Lubricate hardware and moving parts.
  - 4. Clean glass of pre-glazed units promptly after installation of windows.
- H. Protection:
  - 1. Provide protection to prevent damage to window units.
  - 2. Protect all adjacent finished surfaces from scratches and damage.
- I. After completion of storefront installation: Inspect, adjust, put into working order and leave clean, free of labels, dirt, etc. Protection from this point: Shall be the responsibility of the Contractor.

**END OF SECTION**

## SECTION 08520

### ALUMINUM WINDOWS

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Extruded aluminum windows with operating sash, factory glazing, operating hardware, insect screens, and associated accessories.

##### **1.2 RELATED SECTIONS**

- A. 01570-Construction Waste Management,
- B. 08800-Glass & Glazing.

##### **1.3 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 902.2-Sash Balances
  - 2. AAMA 1502.6
- B. ANSI/AAMA 101-Voluntary Specifications for Aluminum Prime Windows and Sliding Doors.
- C. American Society for Testing and Materials (ASTM):
  - 1. A123-Specification for Zinc Coatings on Iron and Steel Products
  - 2. C509-Specification for Cellular Elastomeric Preformed Gasket and Sealants.
  - 3. D2000-Classification System for Rubber Products in Automotive Applications
  - 4. E283-Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors
  - 5. E330-Test Method for Structural Performance of Exterior Windows
  - 6. E331-Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- D. Florida Building Code (FBC).
- E. International Organization for Standardization (ISO) 14021–1999;Environmental Labels and Declarations
- F. National Fenestration Rating Council (NFRC) Labeling Program.
- G. State Requirements for Education Facilities (SREF).

##### **1.4 SYSTEM DESCRIPTION**

- A. Performance requirements: Fabricate units to comply with the following requirements and performance.
  - 1. Florida Building Code (FBC).
  - 2. High Performance requirements of ANSI/AAMA A101, Section 3.
  - 3. Provide windows with 45-condensation resistance factor, under provisions of AAMA 1502.6.

4. Limit air infiltration to 0.10 cubic feet per minute per foot of crack at edge of operable sash; tested by ASTM E283, for 20 percent of pressure resulting from design wind loading.
5. Structural Performance: Provide units with no failure or permanent deflection for a positive (inward) and negative (outward) test pressure of that meets or exceeds the design pressures shown on the Contract Documents, and the missile impact criteria.

## 1.5 SUBMITTALS

- A. Product Data:
  1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  2. Energy Efficiency:
    - (a) Submit product data indicating aluminum window Solar Heat Gain Coefficient (SHGC) and Visible Light Transmittance (VT) in accordance with the National Fenestration Rating Council (NFRC) methodology.
  3. Manufacturer's specifications and catalog cuts.
- B. Shop Drawings: Indicate elevations, locations, markings, quantities, materials, jamb conditions, metal thickness, sizes, shapes, dimensions, finishes, and wind pressures.
  1. Indicate locations for installing frames.
  2. Indicate methods of assembling, connecting, anchoring, fastening and bracing.
  3. Indicate types, material, finishes, sizes and locations of hardware.
  4. Indicate which panels of each window unit are operable and which are fixed.
  5. Identify each type of mullion and anchorage.
  6. Identify maximum allowable design pressures for windows and mullions.
- C. Samples:
  1. Aluminum and color finish including metal materials, glass, screen and screen frame, and glazing gaskets.
  2. Sealants: Provide manufacturer color chart and sample for selection by Project Consultant.
  3. Operator mechanisms.
- D. Manufacture installation instructions: Indicate special procedures and conditions requiring special attention.
- E. Warranty.

- F. Submit complete current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

## **1.6 QUALITY ASSURANCE**

- A. Design Requirements: Design exterior window systems without exterior louvers and window with exterior aluminum louvers to conform to the Florida Building Code and meet the design pressures shown on Contract Documents and meet the Impact Standards, in compliance with Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA) or Florida statewide product approval.
- B. Regulatory Requirements:
  - 1. Notify Building Code Inspector (BCI) within 24-hours after completion of windows to arrange for inspection.
  - 2. Do not conceal anchors and connections until inspection is complete.
- C. Single Source Responsibility: Provide aluminum windows produced by a single manufacturer capable of showing prior production of units similar to those required.
- D. Emergency Escape and Rescue: Where required, must comply with the requirements the FBC and Florida Fire Prevention Code without compromising the aesthetics of the windows.
- E. Coordination of Fabrication:
  - 1. Check actual window openings in construction work by accurate field measurement before fabrication, and show recorded measurements on final shop drawings.
  - 2. Coordinate fabrication schedule with construction progress as directed by Contractor to avoid delay of work.
- F. Repair damaged materials, or replace units that cannot be repaired to original condition. Replace materials that are warped.
- G. Protect exposed surfaces of metal with removable covering to prevent damage to finish. Protect metal while adjacent stucco work, painting and caulking is being performed.
- H. Labeling: Each unit shall bear a permanent label with manufacturer's name or logo, city, and state.
- I. All work shall be performed in accordance with referenced standards.

## **1.7 DELIVERY, STORAGE and HANDLING**

- A. Deliver packaged materials in manufacturer's original, unopened, labeled containers.
- B. Store in accordance with manufacturer's published instructions, above grade on dunnage, properly protected from weather and construction activities.

## **1.8 WARRANTY**

- A. Submit written warranty, signed jointly by manufacturer, installer and Contractor, agreeing to replace aluminum window units, which fail in materials or installations within 3 years of date of acceptance. The 3 parties jointly and separately are responsible for the installation for the period stated herein.
- B. Failure of materials or installation: Include, but not be limited to, excessive leakage or air infiltration, excessive deflections, faulty operation of sash, deterioration of finish or metal in excess or normal weathering, and defects in hardware and weather-stripped.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. All aluminum window assemblies are to contain recycled content.
- B. Window Performance and Class Designations:
  - 1. Provide window units complying with the requirements of ANSI/AAMA 101:
    - (a) Performance Class: Heavy Commercial (HC)
    - (b) Performance Grade (aka: wind pressure): As noted on the drawings.
- C. Basic Materials:
  - 1. Extrusions: AA-6063 T-5 aluminum alloy.
  - 2. Surface: Free of scratches and blemishes.
  - 3. Emergency Escape and Rescue: Provide hinged louver section and hopper section opposite lower hopper to comply with emergency escape and rescue requirements when required.
  - 4. Glaze louver sash of designated fire exit and lower sash of windows adjacent to fire exit on either side with 1/4 inch fully tempered glass.
  - 5. Provide latch at meeting rails to lock sash in closed position.
  - 6. Provide for water drainage on louvers.
  - 7. Glazing: Refer to Section 08800-Glazing for Exterior Glass.
- D. Hinged Emergency Escape and Rescue Windows: Locations are noted on the drawings
  - 1. Outward projecting type or single-hung type windows, which are also side-hinged for swing-out emergency escape.
  - 2. Entire sash (and louvers where applicable) must pivot outward to provide a emergency escape having a minimum clear opening of not less than 5.7 square feet in area with a minimum width of 20 inches and a minimum height of 24 inches.
  - 3. Emergency escape operation from the inside by a single operation and without the use of tools. For emergency escape operation, mount the latching device not more than 48 inches above the finished floor.
  - 4. Provide the following hardware and equipment for emergency escape operation:
    - (a) Hinges: Heavy-duty 6-bar, 90 degree swing-out exit hinges, 2 per sash.
    - (b) Latch: 2-point lift lock latch.

- (c) Exit Device: Provide push-release type lever operator on the window latch complying with requirements of governing regulations.
- E. Aluminum Extrusions: 6063-T5, alloy, minimum 22,000-psi ultimate tensile strength and minimum 0.125-inch thickness at any location for mainframe and sash members.
- F. Fasteners:
  - 1. Aluminum, non-magnetic stainless steel materials warranted by manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.
  - 2. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inches thick reinforce interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splined grommet nuts.
  - 3. Do not use exposed fasteners except for application of hardware.
  - 4. Exposed fasteners: Match finish of adjoining metal.
  - 5. Provide tamper-proof machine screws for exposed fasteners.
- G. Anchors, Clips and Window Accessories:
  - 1. Depending on strength and corrosion-inhibiting requirements, fabricate units of aluminum, non-magnetic stainless steel, or hot-dip zinc coated steel complying with ASTM A386.
  - 2. Exposed items: Match the window frame color.
  - 3. Provide sufficient strength to withstand design pressure indicated.
  - 4. Use nylon shims at all fastener locations to substrate.
- H. Compression Glazing Strips and Weather-stripping: Molded neoprene gaskets complying with ASTM D2000 Designation 2BC415 to 3BC620, or molded expanded neoprene gaskets complying with ASTM C509, Grade 4.
- I. Sealant:
  - 1. Seal frame joints; completely filling voids, flush with exposed surfaces. Provide type recommended by window manufacturer for joint size and movement, to remain permanently elastic, non-shrinking and non-migrating.
  - 2. Comply with Section 07920-Joint Sealants for materials and installation of sealants.
  - 3. Color: As selected by the Project Consultant.
- J. Friction Shoes: Nylon or other non-abrasive, non-staining, non-metallic, non-corrosive durable material.
- K. Balance Mechanism: Spring loaded, with adjustable tension control.
- L. Mullions:
  - 1. Provide mullions and cover plates as shown, matching window units, and complete with anchors for support and installation.
  - 2. Allow for erection tolerances and provide for movements of window units due to thermal expansion and building deflections.
- M. Insect Screens:

1. Provide insect screen unit for each operable exterior sash.
  2. Locate screen units on either interior or exterior side of sash, depending upon window type.
  3. Design window units and hardware to accommodate screens in a tight-fitting removable arrangement, with a minimum of exposed fasteners and latches, and without necessity of wickets for hardware access.
  4. Fabricate screen frames of either extruded or formed aluminum tubular-shaped members minimum 0.040 inch wall thickness, with mitered or coped joints and concealed mechanical fasteners, with removable PVC spline-anchor concealing edge of screen fabric.
  5. Finish frames to match window unit.
  6. Screens: Insect wire fabric, 18 x 16 mesh of 0.024-inch diameter 5052 aluminum wire, complying with FS RR-W-365, Type VII.
- N. Fasteners: Aluminum, stainless steel or zinc plated steel. Properly insulate steel anchors from aluminum.

## **2.2 FABRICATION**

- A. General:
1. Provide manufacturer's standard fabrication that complies with the indicated standards and that produces units that are reglazable without dismantling sash framing.
  2. Include a complete system for assembly of components and anchorage of window units, and prepare sash for glazing except where pre-glazing at the factory is indicated.
- B. Sizes and Profiles:
1. Required sizes for window units and profile requirements are indicated on the drawings.
  2. Variable dimensions are indicated along with maximum and minimum dimensions as required to achieve design requirements and coordination with other work.
- C. Details shown on drawings are based upon standard details by 1 manufacturer. Similar details by other manufacturers will be acceptable, provided they comply with size requirements, minimum/maximum profile requirement, and performance standards as indicated or specified.
- D. Provide weep holes and internal water passages to conduct infiltrating water to the exterior.
- E. Provide sub-frames and anchors for window units where shown, of profile and dimensions indicated but not less than 0.062 inch thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Seal joints on inside with silicone sealant.
- F. Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, in the manner indicated.

- G. Glazing Stops: Provide screw-applied or snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish glazing stops to match window units.
- H. Pre-glazed Fabrication: Pre-glaze window units at the factory where possible and practical for applications indicated. Comply with glass and glazing requirements of the "Glass and Glazing" sections of these specifications, and AAMA 101.
- I. Louvers: Provide louvers for hopper and single-hung type window units as follows:
  - 1. Provide minimum 4-inch wide exterior louvers of 6063-T5 aluminum alloy with minimum 0.064 inch thickness having two 3/4-inch legs running full length of each louver mounted into 0.051 inch thick retainer clips and held by 2 fasteners at each clip.
  - 2. Operate louvers with standard roto-gear handle mounted on interior of window with no interference to window operation. Handle: Forged or cast construction.
  - 3. Weather-strip louvers at each jamb with stainless steel compression or tempered aluminum set in special keyway and vinyl weather-strip in extruded keyway at head and sill.

## **2.3 FINISH ON ALUMINUM**

- A. Class-I Clear Anodic: AA-M12C22A41, minimum 0.7 mils.
  - (a) Texture: Satin
  - (b) Reference Standard: AAMA 2605 with a chrome phosphate pretreatment, Superior Performance Organic Coating.
  - (c) Color: As selected by Project Consultant w/ Owner approval.
  - (d) Product: Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
    - (1) Hylar 5000, by Austimont USA.
    - (2) Kynar 500, by Atochem North America.
    - (3) Megafon, by PPG.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Clean aluminum surfaces and treat following ASTM D1730, Type B, Method 5 or 7.
- B. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface and are under provisions of approved shop drawings.

### **3.2 INSTALLATION**

- A. Install windows under provisions of Section 08800-Glass and Glazing and manufacturer's printed instructions, accepted shop drawings, under direct



supervision of manufacturer's representative(s), and current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

- B. Use only skilled tradesmen, erect all storefront components to all building bench marks and column centerlines.
- C. Erect windows plum, level and true.
  - 1. Do not distort windows by erection screws or fittings.
  - 2. After window erection, apply an even spray coat of liquid wax to window surfaces for protection against stains and scratches.
- D. Separate aluminum from masonry and ferrous metals by use of bituminous coating or gasketing to eliminate possibility of corrosion from electrolytic action.
- E. Protect work from corrosion, prime coat concealed steel stiffeners, anchors, brackets, fasteners and the like prior to installation and seal joints between window frames and building tightly and continuously.
- F. Furnish and apply sealants to provide a weathertight installation at all joints and intersections and at opening perimeters. Wipe off excess material; leave all exposed surfaces and joints clean and smooth.
- G. Maintain wire or clips holding ventilators closed in place until windows are completely erected and hardware is attached.
- H. Adjust operating sash and hardware to provide tight fit at contact points and at weather-stripping, and to ensure smooth operation and weathertight closure.
- I. Cleaning:
  - 1. Clean surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes.
  - 2. Remove excess glazing and sealant compounds, dirt and other substances.
  - 3. Lubricate hardware and moving parts.
  - 4. Clean glass of preglazed units promptly after installation of windows.
- J. Protection:
  - 1. Provide protection to prevent damage to window units.
  - 2. Protect all adjacent finished surfaces from scratches and damage.
- K. After completion of storefront installation: Inspect, adjust, put into working order and leave clean, free of labels, dirt, etc. Protection from this point: Shall be the responsibility of the Contractor.

## END OF SECTION

## SECTION 09220

### PORTLAND CEMENT PLASTER (STUCCO)

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Portland Cement Plaster (stucco), includes but are not limited to, the following:
  - 1. Exterior and interior Portland cement plaster.
  - 2. Interior skim coat over masonry.
- B. Portland Cement Plaster for installation over metal lath, masonry, concrete, and solid backing.
- C. Accessories.

##### 1.2 RELATED SECTIONS

- A. Section 03300-Cast-In-Place Concrete.
- B. Section 04220-Concrete Unit Masonry.
- C. Section 05400-Cold Formed Metal Framing.
- D. Section 06100-Rough Carpentry.
- E. Section 09900-Painting.

##### 1.3 REFERENCES

- A. ASTM (American Society for Testing and Materials):
  - 1. A641-Zinc-Coated (Galvanized) Carbon Steel Wire.
  - 2. C91-Masonry Cement.
  - 3. C847-Metal Lath.
  - 4. C897-Aggregate for Job-Mixed Portland Cement-Based Plasters.
  - 5. C926-Application of Portland Cement-Based Plaster.
  - 6. C1063- Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
  - 7. C1116-Fiber-Reinforced Concrete and Shotcrete.
  - 8. C1328-Plastic (Stucco) Cement.
  - 9. D1784-Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- B. Florida Building Code (FBC).
- C. Portland Cement Association (PCA) Portland Cement Plaster (Stucco) Manual.

##### 1.4 SUBMITTALS

- A. Submit product data and manufacturer's installation instructions for each product, including data showing compliance with requirements.
- B. Provide product data on stucco materials and accessories, including characteristics and limitations of products specified.
- C. Material Certificates: Submit producer's certificate for each kind of plaster aggregate indicating materials comply with requirements.
- D. Test Reports: Provide test reports from an independent laboratory certifying that cement, sand aggregate and other stucco mix components are free from contaminants and low alkalinity.

## **1.5 QUALITY ASSURANCE**

- A. Applicator: Company specializing in application of stuccowork and with minimum 3 projects equal in scope to this work and 5 years documented experience on projects of similar scope.
- B. Except as modified herein, apply cement plaster under provisions of the Florida Building Code, PCA Plaster (stucco) Manual, and ASTM C926. Maintain one copy of each standard on site.
- C. Suspension systems exposed to wind shall be designed by a Florida Registered Design Professional. Shop drawings shall be submitted in accordance with the design specified.
- D. All work shall be performed in accordance with referenced standards.

## **1.6 MOCK-UP**

- A. Before installation of plaster Work, fabricate mock-up panels for each type of finish and application required using materials, including lath and support system, indicated for final Work.
- B. Install sample panels 4 feet x 4 feet (minimum) x full thickness in location indicated, or if not otherwise indicated, as directed by Project Consultant. Panels may form a part of the finished work if installed under provisions of the design parameters.
- C. Demonstrate proposed range of color, texture and installation to be expected in completed Work.
- D. Obtain Project Consultant and Owner's acceptance of panel's visual quality before start of Work.
- E. Retain panel during construction as standard for judging completed Work.

## **1.7 PRE-INSTALLATION MEETING**

- A. Shall not occur without Shop Drawings approved by the Contractor and accepted by the A/E. Shall convene a minimum of two weeks before starting work of this section.

- B. Required Attendees:
  1. Contractor.
  2. Plastering subcontractor.
  3. Any other subcontractors with associated work.
  4. Architect.
  5. Owner's Project Manager.
  6. Building Department Representative.
  
- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.
  
- D. Agenda shall include:
  1. Review preparation and installation procedures and coordinating and scheduling required with related work.
  2. Review plastering requirements (drawings, specifications, and other contract documents).
  3. Review Shop Drawings and associated submittals.
  4. Review manufacturer's technical materials.
  5. Review and finalize construction schedule related to plastering work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
  6. Review required inspection, testing, certifying and material usage accounting procedures.
  7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary coverings or enclosures.
  8. Tour representative areas receiving plastering, inspect and discuss condition of the substrate, and other preparatory work performed by other trades.

**1.8 DELIVERY, STORAGE AND HANDLING**

- A. Deliver all products in original packages or containers bearing brand name and identification of manufacturer.
  
- B. Store all bag materials inside, under cover and in a manner to keep them dry and protected from contamination and deterioration.
  
- C. Note: Place sand under cover and in a manner to keep it lightly damp and prevent intrusion of foreign materials.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Do not apply stucco when substrate or ambient air temperature is less than 45 degrees Fahrenheit nor no more than 90 degrees Fahrenheit, with a humidity index of less 75, or up to 95 degrees with a humidity index is in excess of 75.
  
- B. Maintain minimum ambient temperature of 45 degrees Fahrenheit during and after installation of plaster for not less than 48 hours.
  
- C. Protect stucco against uneven and excessive evaporation and from blasts of dry air. Apply and cure stucco as required by climatic and job conditions to

prevent rapid dryout. Provide suitable coverings, moist curing, and barriers to deflect direct sunlight and wind, or combination thereof.

**1.10 WARRANTY**

- A. Contractor, Sub-Contractor, each Material Supplier: Provide a 5 year unconditional written Guarantee or Warranty covering all workmanship and materials. Said Guarantee: Under provisions of all stipulations and requirements stated in the General Conditions. All such Guarantees: commence at the date of Substantial Completion and/or date of acceptance of project by Owner, and must include labor and materials to provide repair or replacement of stucco and all finishes including painting, sealants, signage and other components.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- A. Masonry Cement Type S (ASTM C91) or Plastic (Stucco) Cement Type S (ASTM C1328).
- B. Approved Manufacturers of a Portland Stucco System, which contains an integral water-retarding agent, conforming to ASTM C926.
  - 1. Mfr: Vulcan Material; Product: Florida Super Stucco Cement.
  - 2. Mfr: Cemex; Product: CEMEX Broco Stucco Cement or Rinker Stucco Cement.
  - 3. Mfr: Titan America; Product: Stucco Cement.
- C. Aggregate (Conforming to ASTM C897):
  - 1. Sand:
    - (a) Clean, hard, natural sand.
    - (b) Manufactured within the following limits:

Sieve Size	Percent Retained	
No. 4	Min 0	Max 0
No. 8	Min 0	Max 10
No. 16	Min 10	Max 40
No. 30	Min 30	Max 65
No. 50	Min 60	Max 80
No. 100	Min 75	Max 100
No. 200	Min 90	Max 100
- D. Water for mixing and curing Portland cement plaster: Potable, clean, free of contaminants such as; oil, acids, alkali, vegetable matter, salts or other deleterious materials.

**2.2 ADMIXTURES**

- A. Bonding Agent:
  - 1. A non-re-emulsifiable acrylic emulsion. To be used as integrally mixed product when recommended by the Portland Cement-based Stucco manufacturer.
    - (a) Products:

- (1) Mfr: BASF; Product: Thoroseal/Acryl 60.
  - (2) Mfr: Dana Marine Lab, Inc.; Tuf-Link.
  - (3) Mfr: Lambert, Inc.; Product: Acrylbond.
2. Deliver products to job site premixed in the water at specified ratios.
- B. Glass Fibers: Alkali resistant glass fibers conforming to ASTM C1116 (100 percent virgin polypropylene in microfilament form): Micro fiber by Grace Construction Products.
1. Substitutions:
    - (a) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedure.

### **2.3 LATH**

- A. Manufacturer: Tilath, as manufactured by Alabama Metal Industries Corporation (AMICO), or United States Gypsum Company (USG). Comply with ASTM C847.
1. Substitutions:
    - (a) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedure.
- B. Metal Lath: Galvanized
1. For Overhead Installation: 3/8-inch rib lath, 3.4 pounds per square yard.
  2. For Vertical Stucco Installation: Diamond Mesh, 3.4 pounds per square yard.
- C. Paper-backed Wire Fabric Lath: FS-UU-B-690a, Type I, Grade D, Style 2, Asphalt Impregnated Paper Factory-bonded to back; USG Paper backed Metal Lath.
- D. Fasteners: Clips, screws, nails, staples, wire ties, loops, power actuated fasteners, and as recommended by the manufacturer of the lath system. Comply with ASTM C1063.

### **2.4 FRAMING**

- A. Channels: Cold Rolled Steel, 16 gage, galvanized.
1. Main Runner: 1-1/2 inch, 475 pounds/1000 feet.
  2. Cross Furring Channels: 3/4 inch, 300 pounds/1000 feet.

### **2.5 HANGERS**

- A. Tie Wire: Conform to ASTM A 641 with Class I zinc coated (galvanized), soft tempered steel.
1. Support of main runners: No. 9 gage.
  2. Support of cross furring: No. 18 gage.
  3. Support of wire lath: No. 18 gage.
- B. Rod: Cold Drawn, Mild Steel, galvanized, 1/4 inch Diameter.

- C. Strap: Flat Mild Steel, galvanized, 3/16 inch x 1 inch.

## 2.6 ACCESSORIES

- A. Manufacturers
  - 1. Acceptable Manufacturers: Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
    - (a) Plastic Components, Inc. (PCI)
    - (b) Vinyl Corporation.
  - 2. Substitutions:
    - (a) Will be considered by the Project Consultant and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
- B. Accessories, Beads, and Moldings (may be used on wire lath and/or interior applications only): Extruded Polyvinylchloride (PVC). Provide in profile and locations shown on drawings.
- C. Slip Joint and Expansion Joint Moldings (may be on exterior masonry, concrete surfaces, wire lath and/or interior applications only):
  - 1. PCI Slip Joint/Expansion Joint #'s 2079 through 2082, #'s 500-38 through 501-78 and Inside Corner Slip Joint #'s 511-38 through 511-78.
  - 2. Conform to ASTM D1784, Type II, C1063 and D4216
  - 3. 0.050-inch thick polyvinylchloride (PVC).
  - 4. Color: off-white.
  - 5. Size: 10 foot lengths.
  - 6. Provide with the following accessories:
    - (a) Connector clips: Polyvinylchloride (PVC) plastic clips for aligning continuous lengths of molding.
    - (b) Notch-Lok Connections: Polyvinylchloride back plates for aligning intersecting lengths of moldings.
    - (c) "+" and "T" Intersections: Factory fabricated intersections used to connect horizontal and vertical joints of moldings.
- D. Reveal Moldings (may be on exterior masonry, concrete surfaces, wire lath and/or interior applications only):
  - 1. PCI "F" Plaster Reveal #'s F707-38 through F714-78.
  - 2. Conform to ASTM D1784, Type II, C1063 and D4216.
  - 3. 0.050-inch thick polyvinylchloride (PVC).
  - 4. Color: Off-white.
  - 5. Size: 10 foot lengths.
- E. Exterior Building Structural Joints over masonry and concrete:
  - 1. PCI Standard Flange Casing Beads #'s 1025 through 1078, "T" Bar Casing Beads #'s 1100 through 1200+ and Plaster Stops #'s 6625 through 66100B.
  - 2. Conform to ASTM D1784, Type II, C1063 and D4216
  - 3. 0.050 inch thick Polyvinylchloride (PVC).
  - 4. Color: Off-white.
  - 5. Size: 10 foot lengths.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive Work.
- B. Verify all surfaces to receive plaster are true and plumb within their allowable tolerance. Notify Project Consultant and Owner if deficiencies exist. Submit proposed remedy of deficiencies to Project Consultant. Do not proceed with work of this section without acceptance of proposed remedy by the Project Consultant.
- C. Concealed Supports, Blocking: Verify items have been installed in proper locations.
- D. Mechanical and Electrical: Verify services within walls and soffits have been installed, tested and approved.

### **3.2 PREPARATION**

- A. Protect other work and building surfaces from splattered stucco.
- B. Clean all exterior block surfaces with a acid based masonry cleaner and wash masonry cleaner off by pressure washing all exterior block surfaces with a machine providing 2,500 p.s.i. at 45 degree angle to remove all foreign matter and form oil from masonry and concrete surfaces. All concrete surfaces shall be prepared to receive plaster to comply with ASTM C926.
- C. Notify the General Contractor in writing of deficiencies in the plane to receive plaster. Tuckpoint bee-holes in all masonry joints and tuckpoint honeycombing in cast-in-place concrete with an ASTM C270 tuckpoint mortar to provide flush, true surfaces to receive plaster.
- D. On exterior masonry and concrete surfaces install temporary grounds and screeds as necessary to strike off plaster to true surfaces (strip-forming). The use of permanent corner beads, fabricated control joints, grounds screeds, recesses, etc. on exterior masonry and cast-in-place concrete surfaces are not allowed, except at building structural expansion joints.
- E. On wire lath and/or interior applications:
  - 1. Install corner beads, control joints, expansion joints and accessories indicated on drawings and noted within this section true and plumb, using maximum lengths available. At intersections of such joints or accessories, the vertical element shall remain continuous and the horizontal element interrupted at such intersection.
  - 2. Anchor corner and casing beads securely to substrate.
  - 3. Expansion and control joints: Tied to the wire lath and not to substrate.
  - 4. Wire lath: Do not extend through expansion or control joints.
- F. Do not apply plaster until electrician has protected all boxes.



- G. Conceal all piping, conduit, etc. which cannot be concealed in walls, columns, or soffits with wire lath and plaster.
- H. Application of Applied Bonding Agent.
  - 1. Exterior Surfaces:
    - (a) DO NOT APPLY BONDING AGENT OF ANY KIND.
    - (b) Dampen exterior surfaces prior to the application of plaster.
    - (c) Verify the surface is free of visible standing water prior to installing plaster.
  - 2. Interior Surfaces: Note: Only on surfaces not subjected to water immersion or high humidity
    - (a) Clean concrete surfaces of foreign matter. Thoroughly dampen surfaces before using acid solutions, solvent, or detergents to perform cleaning. Wash surfaces with clean water.
    - (b) Apply specified bonding agent with a brush or roller on cast-in-place concrete.
    - (c) Dampen concrete and masonry surfaces prior to the application of plaster and maintain in a moist condition throughout the course of application.
    - (d) Verify the surface is free of visible standing water prior to installing plaster.

### **3.3 INSTALLATION-LATHING MATERIALS and ACCESSORIES**

- A. Installation to conform to ASTM C1063; except as modified herein.
- B. Install main runners at 48 inches on center (maximum) with their supports at 36 inches on center, or install main runners at 36 inches on center (maximum) with their supports at 48 inches on center. Install main runners within 6 inches of walls paralleling, to support ends of cross furring. Where system is exposed to wind up-lift, provide vertical stiff legs equal to main runners or better at 8 feet on center (maximum) each way, or closer if required due to uplift loading.
- C. Install cross furring for overhead applications at 16 inches on center (maximum) and for vertical application at 24 inches on center (maximum). Saddle tie furring channels to each main runners with doubled No. 18 tie wire. The span of cross furring: 48 inches on center (maximum).
- D. Apply lath taut, with long dimension perpendicular to supports. Tie lath to supports with No. 18 wire at 6 inches on center for horizontal installation and 9 inches on center for vertical installation.
- E. Lap ends of lath a minimum 1 inch to 1-1/4 inch (maximum). Nest ribs of rib lath at end laps. Secure end laps with tie wire. End laps: shall occur over supports.
- F. Lap sides of diamond mesh lath together minimum 1/2 inch to 1 inch (maximum). Nest outside ribs of rib lath together and secure with wire.
- G. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

- H. Where dissimilar materials abut, provide a continuous expansion joint and joint molding. Wire lath and supports: Do not extend through the joint. At frame conditions, double stud each side of expansion joints.
- I. Place expanded casing beads (Stucco Stop) at termination of stucco finishes and finishes between concrete and framing. Butt and align ends. Secure rigidly in place.
- J. Independently support Light fixtures, A.C. vents, etc.
- K. Install accessories to required lines and levels.
- L. Stucco shall be cut back 1/4 inch from all penetrations through the plaster coat to allow for expansion and contraction of dissimilar materials. A backer rod and sealants shall be placed in separation created.

### 3.4 CEMENT PLASTER MIXES

- A. Applications-Masonry, concrete and Wire Lath:
  - 1. Dash-bond Coat (Apply on concrete surfaces):
    - (a) One bag (1 cubic feet) of Stucco cement.
    - (b) Not more than 2 cubic feet of damp aggregate.
    - (c) Water: Mixed with bonding agent at a rate of one (1) part-bonding agent to 2 parts water.
  - 2. Scratch Coat:
    - (a) One bag of Stucco cement.
    - (b) 2.5 to 4 cubic feet \* of damp aggregate.
    - (c) Water [mixed with bonding agent at a rate of 1 part bonding agent to 2 parts water]. \*\* (Approximately 7 percent solids content).  
 \*The number of shovels of sand equaling one cubic foot shall be calibrated using a cubic foot box and re-calibrated several times a day.  
 \*\* Verify the mixing of the integral bonding agent with Portland Stucco System manufacturer.
  - 3. Brown Coat:
    - (a) One bag of Stucco cement.
    - (b) 3 to 5 cubic feet of damp aggregate.
    - (c) 1/2 pound of fiberglass fibers.
    - (d) Water: Potable.
  - 4. Finish Coat:
    - (a) One bag of Stucco cement.
    - (b) 1.5 to 3 cubic feet of aggregate.
    - (c) Water: Potable.
- B. Mixing:
  - 1. Mechanical Mixer:
    - (a) Provide sufficient horsepower to agitate the stiff stucco mix.
    - (b) Mixer blades: Clean and free of foreign materials.
    - (c) Thoroughly clean mixer after each mix.
  - 2. Load materials into the stucco mixer in the following order:
    - (a) 2/3 of the water.

- (b) 1/2 of the aggregate.
  - (c) All of the Stucco cement.
  - (d) 1/2 of the aggregate (allow to mix 2 minutes).
  - (e) Remaining water.
3. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer. Turn each finished mix for at least 5 minutes.
  4. Do not retemper mixes after the initial set has occurred, or if mix has been prepared more than 60 minutes earlier.
  5. Do not add admixtures other than those specified herein on the job site.

### **3.5 STRESS RELIEF**

- A. Masonry and concrete surfaces:
  1. Install control joints and expansion joints in stucco where these joints occur in the wall substrate.
- B. Installed Wire Lath:
  1. Provide control and expansion joints in locations indicated on drawings and spaced as follows:
    - (a) In any direction not to exceed 18 feet on center.
    - (b) Limit wall area to 144 square feet and ceiling area to 100 square feet.
    - (c) The length to width ratio: Not to exceed 2-1/2 to 1.
    - (d) Provide an expansion joint where stucco support on wire lath abuts dissimilar material.
    - (e) Metal lath shall be discontinuous behind control and expansion joint accessories.

### **3.6 PLASTER APPLICATION**

- A. Apply cement plaster under provisions of ASTM C926 and as herein modified.
- B. Sequence the work to allow for the continuous application of plaster over all surfaces, and including window and door returns, louvers and other features to provide uniform thickness and finishes.
- C. Plaster:
  1. Provide Portland cement plaster (stucco), of the composition indicated, to comply with the following requirements:
    - (a) Dampen masonry and concrete surfaces by fog spraying prior to installation of dash-bond coat or scratch coat. Surface: free of visible water before applying dash-bond coat or scratch coats. As far as possible, apply each coat in a continuous operation so as to avoid unsightly jointing.
    - (b) Where applicable apply dash-bond coat over concrete surfaces, allow to set and moist cure before application of a scratch coat. . A dash-bond coat is a thick slurry mix that is dashed on and provides a mechanical bond for succeeding

plaster. A dash-bond coat shall not replace one of the specified numbers of coats.

- (c) Scratch, brown, and skim coat by hand trowelling.
- (d) Back trowel each coat, applying with heavy pressure to fill voids, eliminate air bubbles, and promote mechanical bond.
- (e) When the scratch coat becomes firm, score the entire surface with scarifier tool before initial set. On vertical surfaces score horizontally. The tool's purpose is to create a score of sufficient width to permit intrusion of the brown coat. Note: The use of wire combs or brushes for scoring the scratch coat is not allowed.
- (f) Strip form all exterior corners.
- (g) Required nominal thickness: With a tolerance of zero to plus 1/8 inch per coat.

(1) Three-coat work on metal plaster base:

(a)	<u>Vertical Surfaces</u>	<u>Horizontal</u>
	<u>Surfaces</u>	
(b) Scratch coat	3/8 inch	1/4 inch
(c) Brown coat	3/8 inch	1/4 inch
(d) Finish coat	1/8 inch*	1/8 inch*
(e) Total	7/8 inch	5/8 inch

\* Plus any raised texture finishes. Note: On wire lath, the scratch coat shall extend 1/4 inch beyond the lath.

(2) Three-coat work on masonry and poured concrete:

(a)	<u>Vertical Surfaces</u>	<u>Horizontal</u>
	<u>Surfaces</u>	
(b) Scratch coat	1/4 inch	-
(c) Brown coat	1/4 inch	-
(d) Finish coat	1/8 inch*	-
(e) Total	5/8 inch	3/8 inch*

\* Plus any raised texture finishes.

(3) Three-coat work on metal plaster base on solid base::

(a)	<u>Vertical Surfaces</u>	<u>Horizontal</u>
	<u>Surfaces</u>	
(b) Scratch coat	1/2 inch	1/2 inch
(c) Brown coat	1/4 inch	1/4 inch
(d) Finish coat	1/8 inch*	1/8 inch*
(e) Total	7/8 inch	7/8 inch

\* Plus any raised texture finishes. Note: On wire lath, the scratch coat shall extend 1/4 inch beyond the lath.

(4) Two-coat work on masonry: (Interior occupied spaces).

	<u>Vertical</u>	<u>Surfaces</u>	<u>Horizontal</u>
(a)	<u>Surfaces</u>		
(b)	Scratch coat	3/8 inch	
(c)	Finish coat	1/8 inch*	
(d)	Total	1/2 inch	3/8 inch*

\* Plus any raised texture finishes.

- (5) Provide 1/4 skim coat on masonry at interior of Mechanical and Electrical spaces.
  2. Stucco finishes: As indicated on drawings.
  3. Stucco surfaces to be straight-edged, with jambs and angles straight and true.
- D. Miscellaneous:
1. Ensure all surfaces are clean and free of harmful materials before application of stucco.
  2. Apply coating continuously without allowing mix to dry at edges.
  3. Fully stucco all exterior exposed or projecting concrete unless otherwise indicated.

### 3.7 CURING

- A. Provide sufficient moisture to all coats to permit continuous hydration of the cementitious materials.
- B. Moist curing of plaster:
  1. Lightly mist the stucco using a nursery-fogging nozzle or with pressure tank nursery sprayer to maintain lightly damp condition. Do not over wet.
  2. The stucco surfaces: Never saturate or directly spray with jetted water.
  3. Ensure there is no visible water on the surface when plaster is applied.
- C. After applying the scratch coat apply each succeeding coat(s) (brown or finish coat) after the coat in place has become sufficiently rigid to resist cracking, the pressures of the new coat being applied and the leveling process, and firm to the touch. Moist cure each coat until the next coat is ready to be applied. Do not saturate the stucco.
- D. After applying finish coat, moist cure a minimum of 3 times a day for a minimum of 3 – 5 days as dictated by weather or as necessary to reach the required pH level to receive paint. Maintain finished work in a continuously moist condition by pH testing until test reading is 8-10. Maintain a written and photographic record of each such test.
- E. Moist curing of plaster must be done by the plaster/stucco applicator (a.k.a. the plasterer).
- F. Comply with ASTM C926.

### 3.8 REPAIRING

- A. Sounding Surfaces:
  - 1. Sound out all stucco on masonry and poured concrete by dragging a small hammer (4 oz ball peen) over the surface.
  - 2. Mark all hollow sounding surfaces that indicate a non-bonding of substrate.
  
- B. Cutting and patching:
  - 1. Cut, patch, point-up, and repair removed plaster as necessary to accommodate other Work and to restore cracks, dents, and imperfections.
  - 2. Remove plaster to eliminate blisters, buckles, excessive crazing, and check cracking, dry out, efflorescence, sweat-out and similar defects, and where bond to substrate has failed, Replace plaster matching adjacent surfaces.

### **3.9 PAINTING**

- A. Prior to painting plaster, ensure the moisture content of the plaster is less than that recommended by the paint manufacturer and the pH of the plaster is less than 10. Verify the moisture content using an electronic moisture meter and the pH using a pH pencil. Test every 1,000 square feet.

### **3.10 CLEANING**

- A. Remove temporary protection and enclosure of other Work.
- B. Promptly remove plaster from doorframes, windows, and other surfaces, which are not to be plastered.
- C. Repair floors, walls and other surfaces, which have been stained, marred, or otherwise damaged during plastering Work.
- D. When plastering Work is completed, remove unused materials, containers and equipment, and clean floors of plaster debris.

### **3.11 PROTECTION**

- A. Provide final protection and maintain conditions, which ensures plaster Work being without damage or deterioration at time of Substantial Completion.

**END OF SECTION**

**SECTION 09250**  
**GYPSUM BOARD**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Gypsum wallboard.
- B. Cementitious tile backer board.
- C. Shaft wall System.
- D. Metal stud wall framing.
- E. Metal channel ceiling framing.
- F. Joint treatment and accessories.
- G. Drywall Accessories.
- H. Textured finish system.

**1.2 RELATED SECTIONS**

- A. Section 01354-Construction Indoor Quality Management.
- B. Section 01572-Construction Waste Management.
- C. Section 05400-Cold Formed Metal Framing.
- D. Section 06100-Carpentry.
- E. Section 07210-Building Insulation.
- F. Section 07270-Firestopping and Smokebarrier Caulking.
- G. Section 07920-Joint Sealants for acoustical sealant.
- H. Section 08110-Steel Doors and Frames.
- I. Section 09125-Plaster Ceiling Suspension System.
- J. Section 09215-Veneer Plaster.
- K. Section 09310-Ceramic Tile.
- L. Section 09900-Painting.

**1.3 REFERENCES**

- A. ANSI (American National Standards Institute).

1. A118.9-Test Methods and Specifications for Cementitious Backer Unit (CBU).
  2. 108.11 Interior Installation of Cementitious Backer Unit (CBU).
- B. ASTM (American Society for Testing and Materials):
1. A641/A641M-Zinc-Coated (Galvanized) Carbon Steel Wire.
  2. C442-Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
  3. C475-Joint Compound and Joint Tape for Finishing Gypsum Board.
  4. C645-Nonstructural Steel Framing Members.
  5. C840-Nonstructural Steel Framing Members.
  6. C931-Exterior Gypsum Soffit Board.
  7. C954-Steel Drill Screws for Application of Gypsum Board or Metal Plaster Bases to Steel Studs.
  8. C1002-Steel Drill Screws for Application of Gypsum Board.
  9. C1047-Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  10. C1147-Determining the Short Term Tensile Weld Strength of Chemical-Resistant Thermoplastics.
  11. C1178-Glass Mat Water-Resistant Gypsum Backing Panel.
  12. C1278-Fiber-Reinforced Gypsum Panel.
  13. C1325-Non-Asbestos Fiber-Mat Reinforced Cement Interior Substrate Sheets.
  14. C1396-Gypsum Wallboard.
  15. C1629- Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
  16. E119-Fire Tests of Building Construction and Materials.
- C. GREENGUARD Product Emission Standard for Children & Schools.
- D. Gypsum Association (GA):
1. GA-214-Recommended Levels of Gypsum Board Finish.
  2. GA-216-Recommended Specification for the Application and Finishing of Gypsum Board.
  3. GA-600-Fire Resistance Design Manual (for fire protection and sound control).
- E. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- F. Steel Stud Manufacturer's Association (SSMA)
- G. Underwriters Laboratory (UL)-Fire Resistance Directory.

#### **1.4 SUBMITTALS**

- A. Submit manufacturer's product data for each type of product specified.
1. Product Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.



- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  - 2. Regional Materials:
    - (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
    - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
    - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
    - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
  - 3. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with the Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda or California Department of Health Services. or GREENGUARD Product Emission Standard for Children & Schools.
- B. Indoor Air Quality (IAQ) Management Plan
  - 1. Include onsite moisture protection plan of all gypsum board materials in storage during construction.

## 1.5 QUALITY ASSURANCE

- A. Fire Resistance Rating: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
  - 1. By reference to Gypsum Association-Fire Resistance Design Manual GA-600 or to design designations in U.L.-Fire Resistance Directory as testing agencies acceptable to jurisdictional authorities.
- B. Single Source Responsibility: Obtain each type of gypsum-board and related joint treatment materials from a single manufacturer.
- C. Finish Work shall be subject to inspection using a lighting level of not less than 50 foot candles at the surface of the gypsum board. Surfaces judged to be unsuitable for finishing, even if finish has been applied, will be rejected.
- D. The A/E will direct repair or replacement of rejected work.

## 1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Proceed with installation of gypsum board materials only after building is weathertight. Any weather/water-damaged drywall will be replaced, (full height of wall panel), at the Contractors expense to the sole satisfaction of the Owner. No weather damaged wallboard will be accepted.
- B. Maintain temperature in areas receiving gypsum board materials between 55 Degrees Fahrenheit and 90 Degrees Fahrenheit during and after installation and provide adequate ventilation.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Gypsum Board: Subject to compliance with specified requirements, provide products and materials by one of the following manufacturers.
  1. Georgia Pacific.
  2. National Gypsum Company.
  3. U.S. Gypsum Co.

### **2.2 MATERIALS**

- A. Toxicity/IEQ: All gypsum board products, joint compound, adhesive, and texture coating materials are to comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
- B. Gypsum Board products shall contain recycled content to contribute to the overall project goal stated in LEED Requirements Section 01352.
- C. Fire-rated Gypsum Board: 5/8 inch thick, Type "C" or Type "X", ASTM C1396, tapered edge, 5/8 inch thick x 48 inches wide x longest stock length to fit available dimensions.
  1. Type "X" board shall carry the U.L. classification mark for 15, 15, 0 surface burning characteristics.
- D. Moisture/Mold Resistant Wallboard (formerly Moisture Resistant M.R. Gypsum Board): Type "X", 5/8 thick
  1. National Gypsum "XP Wallboard".
  2. Georgia-Pacific "DensArmor Plus".
  3. USG "Mold Tough".
- E. Impact Gypsum Panels, comply with ASTM C1629:
  1. Georgia-Pacific "Dens Armor Plus".
  2. National Gypsum "Hi-Impact XP", ASTM C1396, gypsum core wall panel with additives to enhance fire resistance, fiber mesh surface indentation resistance and impact resistance of core and surfaced with abrasion, moisture/mold/mildew resistant paper on front, back and long edges.
  3. USG "Fiberock VHI", ASTM C1278, high-density paperless gypsum and cellulose wall panels.

4. Type: Type "X".
  5. Thickness: 5/8 inch.
- F. Abuse Gypsum Panels:
1. Georgia-Pacific "Dens-Armor Plus Abuse Guard", ASTM C1396, fire-resistant, noncombustible dense gypsum core with abuse resistant coated glass mat facings.
  2. National Gypsum "Hi-Abuse XP", ASTM C1396, gypsum core wall panel with additives to enhance fire resistance, surface indentation resistance and impact resistance of core and surfaced with abrasion, moisture/mold/mildew resistant paper on front, back and long edges.
  3. USG "Mold Tough AR", ASTM C1396, moisture and mold resistant core with moisture and mold resistant recycled face and back paper.
  4. Type: Type "X".
  5. Thickness: 5/8 inch.
- G. Tile Backer Boards:
1. High Moisture Areas: Glass mat water resistant treated gypsum core.
    - (a) Acceptable Product:
      - (1) Georgia-Pacific "DensShield", conforming to ASTM C1178.
      - (2) National Gypsum "XP Wallboard".
      - (3) USG Fiberock Interior Aqua Tough, conforming to ASTM C1396
  2. Wet Areas: Glass mesh water-durable cement core.
    - (a) Acceptable Products:
      - (1) Georgia-Pacific "DensShield", conforming to ASTM C1178.
      - (2) National Gypsum "PermaBase", conforming to ASTM C1325 product standard and ANSI A118.9/A108.11 installation standard.
      - (3) USG "Durock", conforming to ASTM C1325 product standard and ANSI A118.9/108.11 installation standard.
  3. Note: When tile backer boards are not full height and other gypsum panels are used in the same wall, 5/8 inch thick tile backer board must be used when in the same plane as 5/8 inch thick gypsum panel.
- H.
- I. Gypsum Shaftwall or Coreboard: ASTM C442; sizes to minimize joints in place; 1 inch thick; square edges, ends square cut.
- J. Drywall Framing Members: Studs, furring channels, floor and ceiling tracks, connecting accessories and clips as required for a complete framing system. Comply with SSMA and ASTM C 465, galvanized steel, of size and properties necessary to comply with ASTM C754. Members designed for screw-on application of board, fabricated by 1 manufacturer, and meeting or exceeding the following requirements:
1. Stud: 20 gage/30 mils roll formed, channels in required widths, having not less than 1-1/4 inch wide flanges, pierced webs and section properties equal to or exceeding Clark Steel Framing.
    - (a) If stud height exceeds manufacturer's recommendations for indicated size, spacing or surface material, provide heavier

gage studs in conformance with the manufacturer's published recommendations.

- (b) Provide 20 gage/30 mils studs at partitions receiving abuse and impact resistant gypsum board, cementitious board, and walls receiving a tile finish. Provide double studs, 20 gage/30 mils each, at each side of door openings, and at each side of partition openings exceeding 32 inches in width. Screw fasten studs together with 6 inch long pieces of channel runners at 1/4 points of floor to ceiling height. Four screws minimum.
- (c) All studs shall be placed at 16 inches o.c., max.
- (d) Runner Track for Metal Studs: U-shaped 25 gage/18 mils minimum, sized to receive the studs, in not less than 10 foot lengths. Ensure track gage match stud gage.

2. Substitutions:

- (a) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
- 3. Z-Furring Channels: 25 gage/18 mils galvanized "Z" channels in 8'-6" foot lengths, 1 inch, 1-1/2 inch furring depth.
  - 4. Metal Furring Channels: 25 gage/18 mils, hat-shaped channels in 12 foot lengths, 7/8 inch depth.
  - 5. Resilient Channels: 12 foot lengths, 2-1/2 inches width, 1/2 inches depth.
  - 6. 1-5/8 inch studs: 20 gage/30 mils.

K. Fasteners:

- 1. For gypsum panels to steel framing:
  - (a) One inch long type S screw for 1/2 inches and 5/8 inches thick single layer panels to steel studs, power channels.
  - (b) 1-5/8 inch type S screws for 1/2 inches and 5/8 inches thick double layer panels to steel studs, runners, channels.
- 2. For gypsum panels to steel framing (20 gage/30 mils and heavier):
  - (a) One inch long type S-12 screw for 1/2 inch and 5/8 inches thick single layer panels to steel studs, runners up to 14 gage.
  - (b) 1-5/8 inch type S screws and longer for multi layer gypsum board applications.
- 3. For steel studs to runners and door frames:
  - (a) 7/16 type S pan head screws for steel studs to runners, furring, resilient channels.
  - (b) 7/16 inch type S-12 pan head for steel studs to door frame jamb anchor clips; steel studs to runners; other metal to metal attachment up to 14 gage/68 mils.
- 4. For steel floor runner tracks to concrete:
  - (a) Powder actuated ("shot") fasteners, minimum 1 inch length, 24 inches o.c.

L. Adhesive: Embedding type joint compound or laminating adhesive as recommended by gypsum board manufacturer.

- 1. All adhesive materials are to comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.

- M. Joint Treatment Material:
1. Ensure materials comply with ASTM C475, ASTM C840 and recommendations of manufacturer.
  2. Joint Tape: Paper reinforcing tape; use pressure sensitive with compatible joint compound.
  3. Setting-type joint compound, factory pre-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated:
    - (a) Where setting type joint compounds are indicated for use as taping compounds, use formulation which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
    - (b) For pre-filling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
    - (c) For filling joints and treating fasteners of water-resistant gypsum backing board behind for ceramic tile, use formulation recommended by manufacturer.
  4. Drying-type Joint: Factory-prepackaged vinyl based products complying with the following requirements for formulation and intended use:
    - (a) Ready-Mix Formulation: Factory per-mix product.
    - (b) Topping compound formulated for finish (or third) coats.
- N. Gypsum Board Ceiling Components (minimum):
1. Carrying Channels: 1-1/2 inch web, cold rolled steel, having rust-inhibitive coating; or drywall suspension system main tee.
  2. Furring Channels: 3/4 inch web, cold rolled steel, rust-inhibitive coating; or drywall suspension system cross tee.
  3. Wire: ASTM A641/A641M Class I galvanized steel, soft temper. Minimum 8-gage hanger wire and minimum 18-gage tie wire.
- OR
4. Grid Suspension System for Ceilings: Comply with ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
- O. Drywall Accessories; comply with ASTM C1047, provide the following items fabricated completely of heavy gage galvanized sheet steel and distributed by the gypsum board manufacturer.
1. Corner Bead: Gypsum Association Type CB 114 x 114 having 1-1/4 inch or wider flanges.
  2. Casing: Gypsum Association Type LC in size necessary to receive board and designed for finishing with Joint Treatment.
  3. Casing with vinyl gasket having 1/4 inch vinyl foam tape.
  4. Reveal Casing: Extruded aluminum accessory. Designed to form a 3/4 inch wide reveal. 1/2 inch or 5/8 inch size as required by gypsum board thickness.
    - (a) Fry Reglet Corporation-Type "F" FDM-50-75 or 625-75 Type "W" WDM-625-75 as required by conditions, or equivalent.
    - (b) Substitutions:
      - (1) Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.
  5. Control Joint: "V" shaped with 7/8 inch flanges.

- P. Glass Fiber Tape: Federal Specification HH-C-00466 having 20 x 10 thread count.

## 2.3 TEXTURE FINISH

- A. Acceptable Manufacturers:
  - 1. (Basis of Design) Mfr: TWI Dursystem Products; Product: DS4000.
  - 2. Mfr: Litex Finishing Systems, Inc.; Product: Commercial Texture System.
  - 3. Mfr: Roman; Product: Armortex.
  - 4. Mfr: Texcote; Product: Colortex.
  - 5. Substitutions:
    - (a) Will be considered by the Project Consultant and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedure.
- B. Non-Aggregate Finish: High Solids 100 percent Acrylic Texture Coating, mildew resistant, washable, abrasion resistant coating. Provide 2 coat application consisting of a primer/base coat and texture coat.
- C. Texture: Knock-down.
- D. Warranty: 5 years.
- E. Minimum Characteristics:
  - 1. Scrub Resistance, ASTM D2486 2500 cycles.
  - 2. Permeability, ASTM D1653, Method A 16.9.
  - 3. Burning, ASTM E84
    - (a) Flame Spread 5
    - (b) Smoke Development 10
  - 4. Mildew Resistance, ASTM D3273 10
- F. Level of Gypsum Board Finish: Level 4.
- G. Preparation and Application: Per manufacturer's written instructions.

## PART 3 EXECUTION

### 3.1 GENERAL REQUIREMENTS:

- A. Standards: Unless modified or exceeded by the requirements of this Specification, conform to framing system manufacturer's recommendations and then to the following specifications of the Gypsum Association:
  - 1. For Framing: "Installation of Screw-Type Steel Framing Members to Receive Gypsum Board".
- B. For gypsum board application and finishing: Must comply with GA-214-Recommended Levels of Gypsum Board Finish and GA-216-Recommended Specification for the Application and Finishing of Gypsum Board.
- C. Coordination with other Trades:
  - 1. Reinforcing: Reinforce partitions as necessary to accommodate work of other trades that will be attached to bear on drywall construction. Reinforcing shall conform to drywall component manufacturer's

recommendations. Provide back-up members to reinforce framing and provide support at surface mounted items. Verify requirements in Sections where surface mounted work is specified. In the absence of specific requirements, provide minimum 2 inch x 4 inch wood ground/nailer in sufficient width to accommodate the required fastenings. Fasten the ground/nailer rigidly to the drywall framing with 2 screws each side to each stud and close against the drywall facing.

2. Building in other Work: Cut, frame and fit this work around recessed, built into or penetrating work such as fixtures, outlet boxes, fittings, pipes, conduit, etc., and supports.
  3. Finishes: Leave surfaces of this work in acceptable condition to receive applied finishes as scheduled. Review applicable Specification Sections and coordinate with appropriate other trades to determine requirements. Unless specifically scheduled or specified, no texture coat will be used on painted surfaces, therefore the quality of drywall workmanship must be acceptable for application of smooth finishes of the required sheen without evidence of joints, unevenness and surface defects.
  4. Mechanical and Electrical: Cooperate with these trades for location requirements for other work to be installed or located on surfaces provided under this Section. Fit gypsum wall board work close around penetrating work.
- D. Temperature: Maintain continuous controlled interior temperature of at least 55 Degrees Fahrenheit 24 hours before and during application of this work and until building is occupied. Provide adequate ventilation to eliminate excessive moisture.
- E. Workmanship: Test vertical framing with a straight edge both ways to establish that planes are true, plumb and level. If so directed, check the plane of ceiling suspension with a water level and unacceptable areas adjusted until they are satisfactory. Do not cover framing or suspension until it is approved.

### **3.2 FRAMING FOR FURRED CEILINGS, SOFFITS**

- A. Provide Runner Channels to support furred ceilings and soffits. Unless otherwise required by time-design or referenced authority for fire-rated assemblies, space runners at 16 inches on center and within 6 inches of abutting vertical surfaces or other interruption of runners. Tie runners to bar joists or beams with wire.

### **3.3 PARTITION FRAMING**

- A. General: Where drywall studs are required, provide system of type, width and spacing necessary to form partition of required construction and thickness.
1. Special Requirement: Where 1 side of a partition is drywall, provide metal framing required for the partition regardless of the material required on the opposite side.
- B. Tracks: Accurately align tracks under provisions of partition layout. Fasten tracks at 24 inches on center but not less than 2 fasteners per section. Conform to details for sound seal where partitions abut each other and

dissimilar surfaces. Tracks shall be continuous. Stop/start type of installation at floor piping penetrations shall not be allowed. Punch tracks around floor pipes.

C. Studs

1. Screw studs to tracks through both flanges at jambs of openings, partition intersections and corners.
2. Provide an additional stud within 2 inches of end stud where partition abuts a dissimilar surface.
3. At control joints provide double studs spaced 1/2 inch between and fasten board on each side of joint to a separate support.
4. Provide horizontal members behind for work of other trades.
5. Place the studs web-to-web.
6. Locate the short stud over the head member of the opening.
7. Where control joint is required above opening and aligned with jamb, space studs with 1/2 inch between them.
8. Provide a track across head of opening to receive the short studs.
9. Fasten 20 gage jamb stud to each opening frame anchor with 2 fasteners.
10. In addition provide a full length 20 gage stud with 2 inches of each jamb stud.
11. Construct framing above opening as directed by gypsum board manufacturer.
12. Studs shall extend full height from floor to underside of floor or roof.
13. Studs shall be one-piece; no splices shall be accepted.

D. Ground/Nailer: Where top track is located more than 1 foot above the finish ceiling line, provide ground/nailer in the space between studs at the ceiling line for solid backing for gypsum board facing. Use length of track cut and coped tight between stud webs. Fasten track to each stud each side. Provide similar ground/nailer behind horizontal joints in the first layer of gypsum board applied to the studs vertically.

E. Bracing: Where partitions are not braced from both sides by abutting or continuous completed ceiling systems, brace partition framing as necessary to align and hold it for application of the finish, and provide rigidity. Completed ceilings that do not provide bracing for partitions include direct suspension acoustic systems, and any other system that is discontinuous, ceiling-to-ceiling across the partition or discontinuous from ceiling to wall at the partition. Conform to the following minimum requirements:

1. Partition that extends above ceiling: When partition is not tied to framing for abutting ceilings, provide bracing.
2. Partition between ceilings of 2 different heights: When the distance to the lower abutting ceiling measured from the top of the partition is more than 1/3 the maximum partition height, provide bracing.
3. Method: For braces use lengths of studs, single or boxed as required by their length. Locate the diagonal braces 4 feet on center. For partitions short of structure high, fasten braces to the top track. For structure high partitions, fasten braces to a rack fastened across the face of the studs over the facing material and close above abutting ceiling. Extend braces diagonally and fasten them to the structure above. Unless continuous obstructions interfere, ensure braces for partitions having ceilings on both sides extend alternately from



opposite sides of the partition. Other methods of bracing may be submitted for approval prior to use.

### **3.4 VERTICAL FURRING**

- A. General: Vertical furring shall consist of galvanized "Hat-shaped" metal furring channels, 7/8 inch deep at locations shown on the drawings and details. Furring shall be installed at 16 inches on centers unless noted otherwise.

### **3.5 GYPSUM BOARD APPLICATION**

- A. Installation: Use wall boards of maximum practical length to reduce end joints. Ensure edges and ends of boards are in contact but not forced into place. Stagger end joints, ensure joints on opposite sides of a partition do not occur on the same stud, unless fire test states otherwise.
- B. Erect single-layer standard and fire rated gypsum boards in parallel application with vertical edges located over framing members.
- C. Double Layer Application: Use gypsum backing board for first layer, placed parallel to framing or furring members. Place second layer perpendicular to first layer. Ensure that joints of first layer do not occur over joints of first.
- D. Screws: Spaced not less than 3/8 inch from ends and edges of wallboard. Spaced not over 12 inches apart on sidewalls. Ensure wallboard is held in contact with the member while the screws are being driven. Recess the heads slightly below the surface of the wallboard with the final drive. Care must be taken not to break the paper face.
- E. Gypsum panel products applied to walls shall be applied with bottom edge spaced above the floor and seal for fire protection and sound control. Refer to GA-216, applicable fire protection requirements and sound control requirements for amount of space above the floor

### **3.6 DRYWALL ACCESSORIES**

- A. Corner Beads: Required at external corners of face board, continuous in 1 piece from floor to ceiling.
- B. Casings: Required at visible edges of boards and where face board abuts a dissimilar material. Use casing in long lengths with tight butt joints and mitered corners.
- C. Control Joints: Unless noted otherwise on the drawings, provide control joints where a wall or partition runs in an uninterrupted straight plane exceeding 30 feet, provide at 30 feet on center maximum spacing.
- D. Edge Trim: Shapes as required under provisions of ASTM C1047.
- E. Material: Formed metal complying with sheet steel zinc-coated by hot-dipped process.

### **3.7 GYPSUM BOARD FINISHING**

- A. Standards: Finish visible drywall work smooth. Flush and even to a level consistent with Level 4 work as described by Gypsum Associations “GA-214” Recommended Levels of Gypsum Board Finish”. Any work not conforming to this standard shall be made acceptable as directed by Project Consultant at no additional cost to the owner.
- B. General:
  - 1. Pre-fill open joints with setting-type joint compound. Allow joint compound to completely harden.
  - 2. Treat joints and fastener heads at all board surfaces. Where board is required to extend above finish ceiling, or is concealed by permanent construction (or equipment), treat joints and fastener heads using full number of joint compound coats, final sanding may be omitted.
- C. Embedded Tape: Apply a uniformly thin 4 inch wide layer of joint compound over each joint. Center joint tape over the joint and embed it into the compound leaving sufficient material under the tape to provide a proper bond. While embedding, apply a thin coat of joint compound over the tape. At inside corners reinforce inside corner angles with the tape folded to conform to the angle and embed into compound. Allow to dry completely.
- D. Full Coat Application (Floating): Cover the tape with a coat of joint compound extending approximately 3 inches on each side of the tape and feathered out at the edges. Allow to dry completely. Apply a second coat of all purpose compound fill coat 10 inches wide over taped joints, bead and trim feather edge of second coat approximately 2 inches beyond edge of first coat. Spot fasteners with second coat allow to dry completely.
- E. Finish Coat Application: After second coat is dry smooth tool marks and other protrusions with a finishing knife. Apply a thin finish (third) coat of ready-mixed topping or all-purpose compound over joints, fasteners, beads and trim. Feather edges of third coat at least 2 inches wider than second coat.
- F. Dry Sanding: Sand joint compounds to prepare gypsum drywall surfaces for painting. Sand as necessary to remove excess joint compound from tool marks, lap marks and high crowned joints. Scratches and craters and nicks shall be filled with joint compound, then sanded. Do not remove these depressions by sanding only.

**END OF SECTION**

## **SECTION 09310**

### **CERAMIC TILE**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Types of work in this section include, but are not limited to the following:
  - 1. Floor and wall tile.
  - 2. Trim and special shapes.
  - 3. Setting and Grouting materials
  - 4. Marble thresholds and window sills.
  - 5. Sealing of expansion and other joints in tile work with elastomeric joint sealants.

##### **1.2 RELATED SECTIONS**

- A. Section 01572-Construction Waste Management.
- B. Section 09250-Gypsum Board.
- C. Section 09330-Quarry Tile.
- D. Division 15 floor drains.

##### **1.3 REFERENCES**

- A. American National Standard Specifications for Ceramic Tile (ANSI).
  - 1. A108.4-Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy.
  - 2. A108.5-Installation of Ceramic Tile with Dry-Set Portland Cement Mortar.
  - 3. A108.10-Installation of Grout in Tilework.
  - 4. A118.1-Standard Specification for Dry-Set Portland Cement Mortar.
  - 5. A118.4-Standard Specification for Latex-Portland Cement Mortar.
  - 6. A137.1-Standard Specification for Ceramic Tile.
  - 7. C1028-Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- B. American Society for Materials and Testing (ASTM).
  - 1. C503-Marble Dimension Stone (Exterior).
  - 2. C920-Elastomeric Joint Sealants.
- C. GREENGUARD Product Emission Standard for Children & Schools.
- D. ISO 14021–1999; Environmental Labels and Declarations.
- E. RFCI FloorScore Program.

- F. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- G. TCNA Handbook for Ceramic Tile Installation.

#### **1.4 DEFINITIONS**

- A. Definition: Ceramic tile includes ceramic surfacing units made from clay or other ceramic materials.

#### **1.5 PERFORMANCE REQUIREMENTS**

- A. Static Coefficient of Friction for Floor Tile: Provide products with the following values as determined by testing per ASTM C1028.
  - 1. Level surface: Minimum 0.6 wet result.
  - 2. Stair Treads: Minimum 0.6 wet result.
  - 3. Ramp surfaces: Minimum 0.8 wet result.

#### **1.6 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required, except bulk materials. Include complete maintenance recommendations.
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with GREENGUARD Product Emission Standard for Children & Schools, RFCI FloorScore Program, or the Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
  - 2. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of the assembly.
- B. Samples for Initial Selection Purposes: Submit manufacturer's sample boards consisting of actual tiles or sections of tile showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.

- C. Samples for verification purposes: Submit the following:
  1. Samples for each type of tile and for each color and texture required, not less than 12 inch square, on plywood or hardboard backing and grouted. Provide larger sample board when necessary to show field and accent tiles.
  2. Full size samples for each type of trim, accessory and for each color.
  3. Six inch long samples of marble stone thresholds and window sills.
- D. Master Grade Certificates: Submit for each shipment and tile type, signed by tile manufacturer and installer.
- E. Qualification Data: Submit certification, as specified under Quality Assurance article, substantiating capabilities and experience of installing firms and installing workers doing similar work.

## **1.7 QUALITY ASSURANCE**

- A. Maintain one copy of TCA Handbook and ANSI A108 Series/A118 Series on site.
- B. Source of Materials: Provide materials obtained from one source for all tile of same type.
  1. Provide grout and setting materials from one source.
- C. Tile shall conform to requirements of ANSI 137.1, standard grade.
- D. Tile installation shall conform to Tile Council of North America (TCA)-Handbook for Ceramic Tile Installation.
- E. Manufacturers: Company specializing in the manufacturing of tile systems with a minimum of 10 years documented experience doing similar work.
- F. Installer: Company specializing in the installation of tile systems with a minimum of 5 years documented experience doing similar work.

## **1.8 PRE-INSTALLATION MEETING**

- A. Shall not occur without all submittals approved by the Contractor and accepted by the A/E. Shall convene a minimum of two weeks before starting work of this section.
- B. Required Attendees:
  1. Contractor.
  2. Tile Installer.
  3. Tile System Manufacturer.
  4. Installers of floor slab construction to receive tile work.
  5. Any other subcontractors associated with tile work.
  6. Architect.
  7. Owner's Project Manager.
  8. Owner's Maintenance Foreman.
  9. Building Department Representative.

- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.
- D. Agenda shall include:
  1. Review preparation and installation procedures and coordinating and scheduling required with related work.
  2. Review tile system requirements (drawings, specifications, and other contract documents).
  3. Review Shop Drawings and associated submittals.
  4. Review manufacturer's technical materials.
  5. Review and finalize construction schedule related to tile work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
  6. Review required inspection, testing, certifying and material usage accounting procedures.
  7. Tour representative areas of tile floor slabs, inspect and discuss condition of the substrate, floor slopes to drains, outlets, penetrations and other preparatory work performed by other trades.

## **1.9 DELIVERY, STORAGE, and HANDLING**

- A. Deliver and store packaged tile, setting, and grouting materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A137.1 for labeling sealed tile packages. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store liquid latexes and emulsive adhesives in unopened containers and protect from freezing and extreme heat.

## **1.10 PROJECT CONDITIONS**

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations
- B. Maintain temperatures in tiled areas during installation and for 7 days after completion comply with ANSI and published manufacturer's instructions.

## **1.11 EXTRA STOCK**

- A. Deliver minimum of 3 percent of total square feet of each color and pattern of field tile material required for project for maintenance use.
- B. Deliver minimum of 3 percent of total linear feet of each color and pattern of accent or edge strip material required for project for maintenance use.
- C. Clearly identify each carton.

## 1.12 WARRANTY

- A. Provide a two-year written labor and material warranty.
- B. Should defects develop, including any loss of adhesion to the sub floor or wall surfaces, completely replace tile to the satisfaction of the Owner, at no additional cost to the Owner.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with specified requirements, provide products by one of the following manufacturers (refer to Section 01620-Product Options for Buy American First-Foreign Product Limitations):
  - 1. Floor Tile:
    - (a) Unglazed Porcelain Mosaics:
      - (1) American Olean Division of Dal-Tile International Corp.
      - (2) Crossville, Inc. Dal-Tile Corp.
      - (3) Dal-Tile Corp.
      - (4) Interceramic.
  - 2. Glazed Ceramic Wall Tile (semi-gloss or matte finish, with cushion edges):
    - (a) American Olean Division of Dal-Tile International Corp.
    - (b) Dal-Tile Corp.
    - (c) United States Ceramic Tile Company.
  - 3. Setting Materials:
    - (a) Custom Building Products.
    - (b) Laticrete International, Inc.
    - (c) Mapei Corporation.
  - 4. Latex Portland Cement Grout:
    - (a) Custom Building Products.
    - (b) Laticrete International, Inc.
    - (c) Mapei Corporation.
  - 5. Epoxy Grout:
    - (a) Custom Building Products.
    - (b) Laticrete International, Inc.
    - (c) Mapei Corporation.

### 2.2 MATERIALS

- A. Toxicity/IEQ: All tile products, threshold and window sill, setting, grouting, and waterproofing/crack-suppression membrane materials are to comply with GREENGUARD Product Emission Standard for Children & Schools, RFCI FloorScore Program or the Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.

- B. All tile products materials are to contain recycled content.

### **2.3 GENERAL**

- A. ANSI Ceramic Tile Standard: Comply with ANSI A137.1-American National Standard Specifications for Ceramic Tile for types and grades of tile indicated.
  - 1. Furnish tile complying with "Master Grade" requirements for standard grade materials unless otherwise indicated.
- B. ANSI Standard for Tile Installation Materials: Comply with ANSI A108, A118, and A136.1 for installation products and materials indicated.
- C. Colors, Textures and Patterns: For tile and other products requiring selection of colors, surfaces textures or other appearance characteristics, provide products to match characteristics indicated or, if not otherwise indicated, as selected by Project Consultant from manufacturer's standard chart.
  - 1. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Mounting: Where factory-mounted tile is required, provide back or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.

### **2.4 TILE PRODUCTS**

- A. Unglazed Porcelain Mosaics: Through color body, nominal size not larger than 2 inch x 2 inch, thickness: 1/4 inch, with cushion edges.
- B. Glazed Ceramic Wall Tile: Nominal size 4-1/4 inch x 4-1/4 inch or 6 inch x 6 inch, thickness: 5/16 inch, with cushion edges.
- C. Colors as selected by the Project Consultant from full range of manufacturer's standard color chart.
- D. Layout and pattern to be determined using maximum of 3 colors. Tiles may be selected from Price Groups 1-5.
  - 1. Field Tiles: Group 1.
  - 2. Accent Tiles: Groups 1-5.
- E. Trim Units and Special Shapes: Provide tile trim units and special shapes to match characteristics of adjoining flat tile and to comply with the following requirements:
  - 1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile, where applicable.
  - 2. Base: Cove base units, width and height to match wall tile.
  - 3. External Corners: Bullnose shapes with round out base and top trim special shapes.
  - 4. Internal Corners: Field-butted square with square in-corner base and top trim special shapes.



## **2.5 THRESHOLDS and WINDOW SILLS**

- A. General: Provide marble, that is uniform in color and finish, fabricated to sizes, and profiles indicated or required to provide transition between tile surfaces and adjoining finished floor surfaces.
- B. Thresholds (natural stone marble): Provide marble thresholds complying with ASTM C 503 requirements for exterior use and abrasion resistance for uses subject to heavy foot traffic.
  - 1. Provide White Georgia or Madre Cream Alabama marble complying with MIA Group "A" requirements for soundness.
  - 2. Size 2-1/4 inches wide, 1/2 inch thick maximum with beveled edges for handicap accessibility.
- C. Window Sills (natural stone marble): White Carrera marble with gray veins, 5/8 inch thick with beveled top edge.

## **2.6 SETTING MATERIALS**

- A. Organic Adhesive (thin-set): ANSI A136.1; Type II. Provide primer-sealer where recommended by manufacturer.
- B. Latex/Portland Cement Mortar (thick-set): Provide materials to comply with ANSI A118.4 as required for installation method designated, unless otherwise indicated.
- C. Dry-Set Portland Cement Mortar (thin-set): Pre-sanded product in accordance with ANSI A118.1 and by manufacturer.
- D. Latex/Polymer Modified Portland Cement Mortar (thin-set): Use one of the following complying with ANSI A118.4 unless otherwise required.
  - 1. Dry-set mortar made of factory-blended cement and aggregates requiring only the addition of water at job site.
  - or
  - 2. Dry-set mortar made of factory-blended cement and aggregates requiring only the addition of latex mortar additive such as Laticrete 4237 or Project Consultant and Owner approved equal.

## **2.7 GROUTING MATERIALS**

- A. Polymer-Modified Cement Grout (formerly called latex-Portland cement grout): Proprietary pre-blended compound of Portland cement selected and graded aggregates, color pigments and chemical additives gaged with latex additives to comply with manufacturer's directions and ANSI A118.7.
  - 1. Sanded/Unsanded Grout:
    - (a) 1/8 inch wide or less: Unsanded.
    - (b) 1/8 inch wide or greater: Sanded.
  - 2. Color: As selected by Project Consultant. Provide selection of manufacturer's full range of colors.

- B. Epoxy Grout (use at following spaces: Kitchen, Locker Room, Shower Room, Janitor Closet, Extractor and Grinder Room, and Group Toilet Rooms):
  - 1. Comply with ANSI A118.3: 100 percent solid, stain resistant, chemical resistant. Complying with ANSI A118.8. Certified by manufacturer for intended use.
  - 2. Color: As selected by Project Consultant. Provide selection of manufacturer's full range of colors.

## **2.8 WATERPROOFING and CRACK-SUPPRESSION MEMBRANES for THIN-SET SHOWER TILE INSTALLATIONS**

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Waterproofing (Shower Liner):
  - 1. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-Portland cement mortar.
    - (a) Mfr: Nobleseal Company; Product: Chloraloy.
  - or
  - 2. Polyethylene-Sheet Product: Polyethylene faced on both sides with fleece webbing for adhering to latex-Portland cement mortar.
    - (a) Mfr: Schluter Systems LP; Product: KERDI.
- C. Crack-Suppression:
  - 1. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-Portland cement mortar.
    - (a) Mfr: Nobleseal Company; Product: CIS.

## **2.9 ACCESSORIES and MISCELLANEOUS MATERIALS**

- A. Thresholds and Metal Edge Strips: As selected by Project Consultant.
- B. Movement and Control Joint Profiles:
  - 1. Schluter Dilex-EDP Stainless Steel Movement Joint.
- C. Sealant: Provide sealant for joints as specified in Section 07920-Joint Sealants for required use, Type, Grade and Class.
- C. Tile Cleaner: Neutral cleaner specifically acceptable to tile manufacturer and grout manufacturer.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and substrate that will receive setting materials and quarry tile, before installation begins. With the installers present, review for compliance with requirements for installation tolerances and other conditions that will affect performance of tile installation.

- B. Acceptable Tolerance: Comply with tolerances as listed in ANSI A108 Series “Specifications for Installation of Ceramic Tile” for installation condition and method.
  - 1. Slope finished tile to drains 1/4 inch/foot.
- C. Verify conditions and surfaces to receive tile to ensure:
  - 1. Surfaces are firm, dry, clean and free of dust and oily or waxy films.
  - 2. Grounds, anchors, plugs, hangers, recess frames, waterproofing, membrane, electrical and mechanical work in or behind tile have been installed prior to start of tile work.
- D. Do not proceed with work until defects or conditions adversely affecting quality and execution of quarry tile work are corrected.
- E. Verify that concrete slab surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
  - 1. Moisture Emission Rate: Not greater than 3 lb per 1,000 sq ft per 24 hours when tested using calcium chloride moisture kit for 72 hours.
  - 2. Alkalinity: pH range of 5-9.

### **3.2 PREPARATION**

- A. Do not use liquid curing compounds or other coatings that may prevent bonding of tile materials to slabs. Slab shall be dry at times of tile installation.
- B. Layout: Prepare layout of tile work so as to align joints of floor, base, wall tile, and trim when pieces are of the same size. Lay out so as to center tile fields in both directions in each space or area, to minimize tile cutting, and provide lay out so as to minimize use of tile that are less than one-half tile in size.
  - 1. Locate expansion joints and other joint types to be sealant filled during installation of setting material. Do not saw cut joints after tile has been installed.
  - 2. Locate joints in tile surfaces directly over joints that occur in concrete or other substrate material.
- C. Preparation of Concrete Floors for Setting Beds:
  - 1. Bondability:
    - (a) Where tile is to be installed, concrete slabs should not have air entrainment or other additives in the mix, nor sealers or curing compounds applied without specific approval of mortar and grout manufacturer.
    - (b) Slabs should have steel trowel and fine broom finish and be free of laitance.
    - (c) In case of any question on condition of slab, it should be tested for bondability with a Dillon Dynamometer, and show a tensile bond of not less than 300 psi.
  - 2. Levelness:
    - (a) Before tile is applied, test structural floor for levelness or uniformity of slope by water. Fill, level, and retest areas as

required to meet tolerances specified in Section A-3 of ANSI A108.1 and retest.

- (b) When specified levelness or uniformity of slope is obtained, prepare floors for setting bed in accordance with ANSI A108.1.

### **3.3 INSTALLATION**

- A. Install tile, setting materials, and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- B. Refer to Section 09250-Gypsum Board for "Tile Backer Boards".
- C. Setting Methods:
  - 1. Wall Tile:
    - (a) On Gypsum Board in Dry Areas: ANSI A108.4 (Referenced TCA Method Number W242 Organic Adhesive) with Latex-Portland Cement Grout.
    - (b) On Tile Backer Board in High Moisture or Wet Areas: ANSI A108.5 (Referenced TCA Method Number W244, W245, B415, or B420 Dry-Set, Latex-Portland Cement Mortar, or Latex/Polymer Modified Portland Cement Mortar) with Latex-Portland Cement Grout; provide expansion joints under provisions of TCA Method EJ171.
  - 2. Floor Tile:
    - (a) Concrete Slab: ANSI A108.5 (referenced TCNA Method Number F113) with latex Portland cement grout or epoxy grout ANSI 108.6 Epoxy Mortar and Grout and (referenced TCNA Method Number F114).
- D. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignment.
- E. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Where acoustic tile ceilings occur, install ceramic wall tile to a line 2 to 4 inches above plane of exposed surface of ceiling.
- H. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated, or if not indicated, at spacing and locations recommended in TCA "Handbook for Ceramic Tile Installation", and approved by Project Consultant.

1. Prepare joints and apply sealant to comply with requirements of referenced standards and sealant manufacturer.
- I. Grout tile to comply with referenced installation standards, using grout materials indicated.
- J. Mix and install proprietary components to comply with grout manufacturer's directions.
- K. Joints:
  1. General: Place tile joints in uniform width, subject to variance in tolerance allowed by tile size. Make points watertight, without voids, cracks, excess setting material, or excess grout.
  2. Joint widths: Shall be per manufacturer's published recommendations.
  3. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor; base, walls and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting and to avoid cut tiles less than one-half the tile size. Provide uniform joint widths, unless otherwise shown.
    - (a) Lay out tile work on floors so that wherever possible no tiles less than half full size occur.
    - (b) Tile mounted in sheets: Make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- L. Sound tile after setting. Replace hollow sounding units.
- M. Keep expansion and control joints free of setting material or grout. Apply sealant to control joints.
- N. Allow tile to set for a minimum of 48 hours prior to grouting.
- O. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes, including perimeter of room.

### **3.4 WATERPROOFING and CRACK-SUPPRESSION MEMBRANE INSTALLATION**

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
- C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

### **3.5 GROUTING**

- A. Installation to comply with ANSI A108.10.
- B. Force grout into joints to fill solid. Remove and re-grout discolored joints. Fill voids in joint grout.

### **3.6 TOLERANCES**

- A. Finished installation shall be true to a tolerance of + 1/8 inch in 10 feet, and + 1/16 inch within any given running foot.

### **3.7 CLEANING and PROTECTION**

- A. Upon completion of grouting, and before grout is completely dry, clean all tile surfaces to ensure they are free of all foreign matter. Remove haze (residue) on tile resulting from grouting as soon as possible.
- B. Do not clean tile with acid solutions or chemical cleaners unless in accordance with both tile and grout manufacturer's written recommendations.
- C. Leave installations finished, clean, and free of chipped, broken, cracked, loose or other defective tile work.
- D. Protect final tile installation in a manner, and so as to maintain conditions, to ensure tile work will not deteriorate or be damaged at time of Substantial Completion.
- E. Protect the entire tile surface area with a heavy-duty non-staining Kraft paper and tape in place.
- F. Prohibit foot and wheeled traffic from newly tiled floors for a minimum of 7 days after grouting is completed.
- G. Just prior to acceptance remove protective paper and rinse neutral cleaner from surfaces of tile. Dry and lightly buff.
- H. Refer to manufacturer's literature for additional details.

**END OF SECTION**

**SECTION 09510**  
**ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Acoustical Tile in exposed suspension.
- B. Suspension Grid Systems for acoustical tile ceilings and perimeter edge trim.
- C. Extent and types of acoustical tile ceilings are indicated on the drawings.
- D. Furnish special anchors or inserts for placement of suspension systems.

**1.2 RELATED SECTIONS**

- A. 01354-Construction Indoor Quality Management
- B. 01572-Construction Waste Management
- C. 09125-Plaster Ceiling Suspension Systems: Suspension framing for plaster ceilings.
- D. 09250-Gypsum Board: Gypsum board ceilings.
- E. 10190-Cubicle Curtain.
- F. Divisions 15 and 16: Items of Mechanical and Electrical work to be installed in acoustical ceiling grids.

**1.3 REFERENCES**

- A. American Society of Testing and Materials (ASTM):
  - 1. A1008/A1008M- Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 2. E84-Surface Burning Characteristics of Building Materials.
  - 3. C635-Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - 4. C636-Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- B. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- C. GREENGUARD Product Emission Standard for Children & Schools.

**1.4 SUBMITTALS**

City of Tampa, Florida  
Kid Mason Community Center

Section 09510  
Acoustical Ceilings  
07-15-2022

- A. Submit shop drawings indicating grid layout and related dimensions, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system: prepare coordinated reflected ceiling plan relating mechanical and electrical work by level elevation above finish floor and their penetrations to acoustical ceiling.
- B. Provide product data on each type of metal suspension grid system components and each type of acoustical ceiling type.
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with GREENGUARD Product Emission Standard for Children & Schools or the Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
  - 2. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- C. Indoor Air Quality (IAQ) Management Plan
  - 1. Include onsite moisture protection of all ceiling tile materials in storage for purposes of construction.
- D. Samples: Submit 2 samples each, twelve inches long, of suspension system main runner, cross runner, and edge trim. Submit two samples full size of acoustical tiles.
- E. Submit manufacturer's printed installation instructions.

## 1.5 **QUALITY ASSURANCE**

- A. Installer: Company with three years minimum documented experience.
- B. Fire Performance Characteristics: Provide acoustical ceiling components that are identical to those tested for the following fire performance characteristics, according to ASTM test method indicated, by the UL or other testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.



- C. Surface Burning Characteristics: As follows, tested per ASTM E84.
  - 1. Flame Spread: 25 or less.
  - 2. Smoke Developed: 50 or less.
- D. Tolerances for Ceiling Grid Installation:
  - 1. Free of irregularities and level to within 1/8 inch in 12 feet.
  - 2. Maximum deflection: 1/360 of span.
- E. Installation of Acoustical Ceiling Suspension Systems: ASTM C635.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Continuously maintain temperature and humidity at a value near those indicated for final occupancy.

**1.7 SEQUENCING and SCHEDULING**

- A. Do not install acoustical ceilings until building is enclosed, air conditioning is working, dust-generating activities have terminated, and overhead work is completed, tested and approved.
- B. Schedule installation of acoustic units after interior wet work is dry.

**1.8 WARRANTY**

- A. Manufacturers minimum 10-year non-sag tile warranty.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- A. All acoustical tile and suspension system products are to contain recycled content.
- B. Toxicity/IEQ: All acoustical tile products are to comply with GREENGUARD Product Emission Standard for Children & Schools or the Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.

**2.2 ACOUSTICAL TILE**

- A. Student Access Areas:
  - 1. Manufacturers: Subject to compliance with specified requirements, provide acoustical ceiling tiles as manufactured by one of the following:
    - (a) Mfr: Armstrong World Industries, Inc.; Product: Fine Fissured #1714, NRC=0.70, CAC=40, thickness=3/4 inch, light reflectance=0.85.

- (b) Mfr: CertainTeed; Product: Fine Fissured High NRC HHF-497 DP, NRC=0.70, CAC=35, thickness=3/4 inch, light reflectance=0.81, with BioShield.
- (c) Mfr: USG; Product: Radar ClimaPlus High NRC #22311, NRC=0.70, CAC=35, thickness=3/4 inch, light reflectance=0.84, with Antimicrobial Treatment.

2. Characteristics:

- (a) Water felted mineral core, with factory applied vinyl latex paint finish; ASTM E1264 Classification Type III, Form 2, Class A.
- (b) Size: 2 feet x 4 feet.
- (c) Non-directional fissured pattern.
- (d) Color: White.
- (e) Edge Detail: Square.
- (f) Flame spread/smoke developed: 25/10.
- (g) Antimicrobial treatment.
- (h) Resistant to sagging in high humidity environment.

B. Administrative Areas:

1. Manufacturers: Subject to compliance with specified requirements, provide acoustical ceiling tiles as manufactured by one of the following:

- (a) Mfr: Armstrong World Industries, Inc.; Product: Fine Fissured #1729, NRC=0.55, CAC=35, thickness=5/8 inch, light reflectance=0.85, with BioBlock.
- (b) Mfr: CertainTeed; Product: Fine Fissured HHF-197, NRC=0.60, CAC=40, thickness=5/8 inch, light reflectance=0.83, with BioShield.
- (c) Mfr: USG; Product: Radar ClimaPlus #2410, NRC=0.55, CAC=35, thickness=5/8 inch, light reflectance=0.84, with Antimicrobial Treatment.

2. Characteristics:

- (a) Water felted mineral core, with factory applied vinyl latex paint finish; ASTM E1264 Classification Type III, Form 2, Class A.
- (b) Size: 2 feet x 4 feet.
- (c) Non-directional fissured pattern.
- (d) Color: White.
- (e) Edge Detail: Square.
- (f) Flame spread/smoke developed: 25/10.
- (g) Antimicrobial treatment.
- (h) Resistant to sagging in high humidity environment.

C. Kitchens:

1. Manufacturers:

- (a) Mfr: Armstrong World Industries, Inc.; Product: Clean Room VL #870, NRC=N/A, CAC=40, thickness=5/8 inch.
- (b) Mfr: CertainTeed; Product: Vinylrock X SAFETONE CLASS A 1140-CRF-1, NRC=N/A, CAC=40, thickness=1/2 inch, Light Reflectance=0.88.
- (c) Mfr: USG; Product: Sheetrock Lay-In Ceiling Panel ClimaPlus #3270, NRC=N/A, CAC=40, thickness=1/2 inch, Light Reflectance=0.70.

2. Characteristics:
  - (a) Gypsum panel core or water felted mineral fiber core, with factory applied vinyl surface; ASTM E1264 Classification Type XX or Type IV Form 2, Class A.
  - (b) Meets USDA/FSIS sanitary standards for food processing.
  - (c) Size: 2 feet x 4 feet.
  - (d) Smooth Pattern, Unperforated.
  - (e) Color: White.
  - (f) Edge Detail: Square.
  - (g) Flame spread/smoke developed: 20/05.
  - (h) Antimicrobial treatment.
  - (i) Resistant to sagging in high humidity environment.

### **2.3 SUSPENSION SYSTEM**

- A. Manufacturers: Subject to compliance with specified requirements, provide suspension grid systems as manufactured by one of the following:
  1. Armstrong World Industries, Inc.
  2. CertainTeed Ceilings.
  3. Chicago Metallic Corp.
  4. (Basis of Design) USG/Donn Products, Inc.
- B. Student Access Areas and Administration Areas: "DX" 15/16 exposed tee system as manufactured by USG Interiors has been used as the basis of design for this project. Provide DX-24 main runner and DX-24 cross tees, and M-7 wall molding standard perimeter. Grid: ASTM C635, Intermediate duty, Class 'A', fire rated and non-fire rated exposed Tee system. Grid Material: ASTM A1008/A1008M, commercial quality hot-dipped galvanized steel. G-30 coating galvanized.
  1. Kitchens: "DXLA" 15/16 exposed tee system, hot-dipped galvanized with aluminum cap.
- C. Accessories: Stabilizer bars, clips, splice, edge moldings and hold down clips required for suspended grid system.
- D. Grid Finish: Factory applied baked polyester finish. Color: White.
- E. Support Channels and Hangers: Galvanized steel; size and type to suit application, to rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- A. Verify that existing conditions are ready to receive work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Beginning of installation means acceptance of existing conditions.

## 3.2 INSTALLATION

- A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and Cisca standards applicable work.
- B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.
  - 1. Install panels with pattern running in one direction.
- C. Install after major above ceiling work is complete. Coordinate locations of hangers with other work.
- D. Install suspension systems to comply with ASTM C636, with hangers supported only from building structural members. Locate hangers not more than 6 inches from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8 inch in 12'-0".
  - 1. Secure wire hangers by looping and wire-tying with 3 twists, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures. Spliced hanger wires are not allowed.
  - 2. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum, which are not part of supporting structural or ceiling suspension system. Splay hangers maximum 30 degrees from true vertical and only where required to miss obstruction. Offset resulting horizontal force by bracing, or other equally effective means.
  - 3. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
  - 4. Screw-attach moldings to substrate at intervals not over 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12'-0". Miter corners accurately and connect securely.
- E. Light Fixtures shall be supported independently of suspension system. The Electrical Contractor is to provide 4 wire hangers, or chains, for each fixture; one hanger at each fixture corner. Install hangers plumb to structure above.
- F. Trim all ends of wire hangers of excess materials.
- G. Install acoustical panels in coordination with suspension system with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- H. Install acoustical units in coordination with suspension system and exposed runner moldings. Scribe and cut units for accurate fit at borders and at penetrations. Stiffen edges of cut units as required to eliminate evidence of oil canning or buckling.

### **3.3 TOLERANCES**

- A. Variation from Flat and Level Surface for Ceiling Grid Installation: 1/8 inch in 10 feet.
- B. Bowed or "Pillowed" ceiling tiles shall not be acceptable. Damaged tiles in any way shall be replaced at no cost to the owner.

### **3.4 CLEANING**

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work, which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

### **3.5 EXTRA STOCK**

- A. Provide extra quantity of acoustical units equal to 2 panels for each 100 panels installed. Obtain receipt from Owner's authorized representative.

**END OF SECTION**

## SECTION 09650

### RESILIENT TILE FLOORING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Resilient flooring tile.
- B. Rubber base.
- C. Installation Accessories.

##### 1.2 RELATED SECTIONS

- A. Section 01572-Construction Waste Management.

##### 1.3 REFERENCES

- A. American Society of Testing Materials (ASTM).
  - 1. E84-Surface Burning Characteristics of Building Materials.
  - 2. E648-Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
  - 3. E662-Optical Density of Smoke Generated by Solid Materials.
  - 4. F1066-Vinyl Composition Floor Tile.
  - 5. F1861-Resilient Wall Base.
  - 6. F2169-Resilient Stair Treads.
- B. GREENGUARD Product Emission Standard for Children & Schools.
- C. International Organization for Standardization (ISO) 14021-1999; Environmental Labels and Declarations
- D. Resilient Floor Covering Institute (RFCI) Floor Score Program
- E. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.

##### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.
  - 1. Low Emitting Materials:
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all adhesives, sealants, and flooring material comply with GREENGUARD Product Emission Standard for Children & Schools, Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers,

including 2004 Addenda. California Department of Health Services or the RSCI's FloorScore program.

2. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  3. Rapidly Renewable Content:
    - (a) Indicate manufacturer and product name for each tracked material, total product cost for each tracked material; and percentage of product, by weight, for each material that meets the rapidly renewable criteria.
- B. Samples for Initial Selection Purposes: Submit manufacturer's standard color charts in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.
- C. Samples for Verification Purposes: Submit the following samples of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.
1. Provide 4 samples of tile flooring of each color specified.
  2. 2-1/2 inch long samples of resilient flooring accessories.
  3. Other material as requested.
- D. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.
- E. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.
- F. Installer certification stipulated in paragraph F of Quality Assurance below.
- G. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.

## **1.5 QUALITY ASSURANCE**

- A. Manufacturers: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

- B. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux (CRF): Not less than 0.45 watts per square cm per ASTM E648.
  - 2. Flame Spread: Not more than 75 per ASTM E 84.
  - 3. Smoke Density: Not more than 450 per ASTM E 662.
- C. Installer shall be certified by the manufacturer to insure warrantable installation.

## 1.6 PROJECT CONDITIONS

- A. Maintain minimum temperature of 65 degrees F in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55 degrees F in areas where work is completed.
- B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturer's recommended Bond and Moisture test, pH test and Vapor Emission test. Submit test results for owner's review prior to the start of work.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
  - 1. Manufacturers of Vinyl Composition Tile:
    - (a) Armstrong World Industries, Inc.
    - (b) Azrock.
    - (c) Mannington, Inc.
    - (d) Toli International.
  - 2. Bio-based Resilient Flooring Tile
    - (a) Armstrong World Industries, Inc.
    - (b) Nora Systems, Inc.
  - 3. Manufacturer of Rubber Wall Base and Stair Treads/Risers:
    - (a) Burke Mercer Flooring Products; Division of Burke Industries, Inc.
    - (b) Flexco Division, Textile Rubber Co.
    - (c) Johnsonite.
    - (d) Nora Systems, Inc.
    - (e) Roppe Corporation.
    - (f) VPI Corporation.
- B. Substitutions:



1. Will be considered by the A/E and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

## **2.2 MATERIALS**

- A. All adhesive and sealant materials to comply with GREENGUARD Product Emission Standard for Children & Schools, Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or the RSCI's FloorScore program.
- B. All resilient floor tile, rubber wall base, and stair tread/riser products shall contain recycled content and comply with GREENGUARD Product Emission Standard for Children & Schools, Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or the RSCI's FloorScore program.

## **2.3 VINYL COMPOSITION TILE**

- A. Provide products complying with ASTM F1066, Class 2 through pattern, composed of vinyl resin, reinforcing fibers, color, pigments, and inert filler, marbled pattern, surface design with color and design continuing through the full thickness of the tile; without variation from surface color and design, minimum size 12 inch x 12 inch x 1/8 inch thick.
- B. Custom floor pattern and color accent requirements are indicated on the Drawings.
- C. Colors: As selected by project consultant from manufacturer's currently available range of standard colors only.

## **2.4 BIO-BASED COMPOSITION TILE**

- A. Provide products complying with ASTM F 1066, Class 2, composed of bio-based vulcanized rubber or polyester resin binders, fillers and pigments with colors and texture dispersed uniformly throughout the thickness of the tile; without variation from color surface and design; minimum size 12 inch X 12 inch x 1/8 inch thick.
  1. Custom floor pattern and color accent requirements are indicated on the Drawings.
  2. Colors: As selected by project consultant from manufacturer's currently available range of standard colors only.

## **2.5 ACCESSORIES**

- A. Wall Base: Provide preformed (a.k.a. molded) rubber cove base 4 inches high x 1/8 thick, standard toe, matte finish, complying with ASTM F1861, Type TS (thermoset), Style B (cove) installed lengths as long as practicable from roll stock; color as selected by consultant from manufacturer's standard range of colors.

- B. Stair Treads: ASTM F2169, Type TS (rubber), Class 1 and 2, Group 1 and 2: Full width and depth of stair tread in 1 piece; return down edge of tread with tapered thickness; square nose; slightly undercut nose on back of tread at inner radius; sanded back.
  - 1. Type: Rubber stair tread with integral riser.
  - 2. Tread Depth: 12 inches including riser.
  - 3. Tread Length: Full width of stair.
  - 4. Thickness: 1/4 inch.
  - 5. Nose Depth: 1-7/8 -2 inches from top of tread.
- C. Rubber Stair Stringers and Risers: Provide units of molded rubber to complement specified rubber stair treads. Size: as required in accordance with profiles indicated on the Drawings.
- D. Edge Reducer Strips: Vinyl types of width shown, 1/8-inch thick, to protect exposed edge of resilient flooring. Color as selected by Project Consultant from manufacturer's standard colors. Provide units of maximum length, to minimize number of joints.
- E. Feature Strips: Where indicated, provide same material thickness as adjacent work, of width and colors and patterns as selected by the Project Consultant from manufacturer's standards.
- F. Adhesives (Cements): Waterproof, low VOC types, stabilized type as recommended by flooring manufacturer to suite material and substrate conditions. Asphalt emulsions and other non-waterproof types are not acceptable.
- G. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.
- H. Leveling and Patching Compounds: Latex type as recommended by flooring manufacturer.

### **PART 3 EXECUTION**

#### **3.1 INSPECTION**

- A. Require Installer to inspect subfloor surfaces to determine that they are satisfactory.
  - 1. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, coatings preventing adhesive bond, and other defects impairing performance or appearance.
- B. Perform Moisture test, Hydrostatic Pressure test, Alkalinity pH test, and Bond test on concrete subfloor to determine if surfaces are satisfactory. Perform 1 test each per 1000 gross square feet of building area. Test locations to be determined by Owner's representative. Ensure that the following are achieved:
  - 1. Moisture Content: Maximum of 3 percent.

2. Hydrostatic Pressure: Less than, or equal to, 3 pounds/1000 square feet/24 hours.
3. Alkalinity pH: less than 10 pH.
4. Bond: achieved by 72 hours.

### **3.2 PREPARATION**

- A. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in sub floors. Tolerance: free of irregularities and level to within 1/8 inch in 10 feet.
- B. Remove coatings from subfloor and lower wall surfaces that would prevent adhesive bond, including curing compounds incompatible with resilient flooring adhesives, paint, oils, waxes, and sealers.
- C. Broom clean or vacuum surfaces to be covered, and inspect subfloor.
- D. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

### **3.3 INSTALLATION, GENERAL**

- A. Install resilient flooring using method indicated in strict compliance with manufacturer's printed instructions. Extend resilient flooring into toe spaces, door reveals, into closets and similar openings, and into electrical floor box covers.
- B. Scribe, cut and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls, partitions.
- C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.
- D. Tightly cement resilient flooring to sub-base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand-roll all resilient flooring areas with 100 lb. weight to assure adhesion.
- E. Rubber wall base must be provided at all casework and custom cabinets.

### **3.4 INSTALLATION OF ACCESSORIES**

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required.
  1. Install base in lengths as long as practicable, with corners fabricated from base materials with mitered inside and outside corners.
  2. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
- B. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material. Color of adhesive filler material is to match wall base color.

- C. Apply edge strips where shown on drawings, and before installation of resilient flooring. Secure units to substrate with manufacturer's recommended adhesive.
- D. Apply stair treads and risers full width of stair, and stringers at all stair locations shown on the Drawings. Fully secure units, including nosings, to substrates with manufacturer's recommended adhesives.

### **3.5 CLEANING AND PROTECTION**

- A. Perform following operations immediately upon completion of resilient flooring:
  - 1. Sweep or vacuum floor thoroughly.
- B. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well sealed in adhesive.
- C. Contractor is to strip and wax resilient flooring. The type of wax to be used is to be identical to the type used by school custodial staff, and as supplied by SBBC District Maintenance to school custodial staff. Contractor to provide floor wax. Contractor to coordinate with owner representative for information regarding type of floor wax.
- D. Wax per manufacturer's written recommendations.
- E. Protection:
  - 1. Protect resilient flooring against damage from rolling loads for initial period following installation by covering by covering with undyed, untreated building paper until inspection for Substantial Completion or hardboard where required to protect against loading or heavy traffic. Use dollies to move stationary equipment or furnishings across floors.
  - 2. Prohibit traffic on floor finish for 48 hours after installation.

### **3.6 EXTRA STOCK**

- A. Deliver stock of maintenance materials to Owner equal to 2 percent of amount installed for each type of resilient tile, base and accessory item installed.
- B. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.

**END OF SECTION**

## SECTION 09900

### PAINTING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of primers, paints, stains, and other coatings for exterior and interior items and surfaces.

##### 1.2 SYSTEM DESCRIPTION

- A. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Project Consultant will select from standard colors and finishes available.
  - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
  - 2. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - 1. Prefinished items include the following factory-finished components:
    - (a) Architectural woodwork.
    - (b) Acoustical wall panels.
    - (c) Toilet enclosures.
    - (d) Metal lockers.
    - (e) Prefinished folding or accordion walls.
    - (f) Elevator entrance doors and frames.
    - (g) Elevator equipment.
    - (h) Finished mechanical and electrical equipment.
    - (i) Light fixtures.
  - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    - (a) Foundation spaces.
    - (b) Furred areas.
    - (c) Ceiling plenums.
    - (d) Utility tunnels.
    - (e) Pipe spaces.
    - (f) Duct shafts.
    - (g) Elevator shafts.
  - 3. Finished metal surfaces include the following:

- (a) Anodized aluminum.
  - (b) Stainless steel.
  - (c) Chromium plate.
  - (d) Copper and copper alloys.
  - (e) Bronze and brass.
4. Operating parts include moving parts of operating equipment and the following:
- (a) Valve and damper operators.
  - (b) Linkages.
  - (c) Sensing devices.
  - (d) Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- C. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

### 1.3 REFERENCES

- A. American Society for Materials and Testing (ASTM).
  - 1. D16-Terminology for Paint, Related Coatings, Materials, and Applications.
  - 2. D3960-Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
  - 3. D4262-pH of Chemically Cleaned or Etched Concrete Surfaces.
  - 4. D4263-Indicating Moisture in Concrete by the Plastic Sheet Method.
- B. Environmental Protection Agency (EPA).
- C. Factory Mutual Global (FMG).
- D. NACE International the Corrosion Society.
- E. GREENGUARD Product Emission Standard for Children & Schools.
- F. Green Seal Standard GS-03, Anti-corrosive paints, Second Edition, January 7, 1997.
- G. Green Seal Standard GS-11, Paints First Edition, May 20, 1993.
- H. National Fire Protection Association (NFPA): NFPA 30-Flammable and Combustible Liquids Code.
- I. Painting and Decorating Contractors Association (PDCA) P4-Responsibility for Inspection and Acceptance of Surfaces Prior to Painting and Decorating.
- J. Society of Protective Coatings (SSPC) SP6-Commercial Abrasion Blast.
- K. Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004

Addenda. California Department of Health Services. Steel Structures Painting Council.

- L. Underwriter's Laboratory (UL).

#### **1.4 DEFINITIONS**

- A. General: Standard coating terms defined in ASTM D16 apply to this Section.
  - 1. Flat: Lusterless or matte finish with a gloss range below 15 when measured at an 85 degree meter.
  - 2. Eggshell: Low-sheen finish with a gloss range between 20 and 35 when measured at a 60 degree meter.
  - 3. Semi-gloss: Medium-sheen finish with a gloss range between 35 and 70 when measured at a 60 degree meter.
  - 4. Full gloss: High-sheen finish with a gloss range more than 70 when measured at a 60 degree meter.

#### **1.5 SUBMITTALS**

- A. Product Data: For each paint system indicated. Include block fillers and primers.
  - 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
  - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
  - 3. Low Emitting Materials:
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's for all products that comply with GREENGUARD Product Emission Standard for Children & Schools.
    - (c) Submit manufacturer's certification for all architectural paint, coating, and primer products applied to interior walls and ceilings that comply with the Green Seal Certification standard GS-11, Paints First Edition, May 20, 1993.
    - (d) Submit manufacturer's certification for all anti-corrosive and anti-rust paint products applied to interior metal ferrous surfaces that comply with the Green Seal Standard GS-03, Second Edition, January 7, 1997.
- B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
  - 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit Samples on the following substrates for Architect's review of color and texture only:
  - (a) Concrete: 4 inch square samples for each color and finish.
  - (b) Concrete Unit Masonry: 4 by 8-inch samples of masonry, with mortar joint in the center, for each finish and color.
  - (c) Painted Wood: 8 inch square samples for each color and material on hardboard.
  - (d) Stained or Natural Wood: 4 by 8 inch samples of natural or stained-wood finish on representative wood surfaces.
  - (e) Ferrous Metal: 3 inch square samples of flat metal and 6-inch long samples of solid metal for each color and finish.

C. Warranty.

## 1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Paint applicator shall be licensed in the State of Florida or in Broward County and use state or county journeymen. Provide a legible copy of license and, when applicable a journeyman's certification attesting to qualification requirements.
  1. Certifications: Paint applicator shall provide a certification attesting to having worked on projects similar in scope to this project for a minimum of 5 years. Paint applicator not providing such documentation or not having the required experience will be removed from the project and replaced by the Contractor.
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
  1. Architect will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
    - (a) Wall Surfaces: Provide samples on at least 100 sq. ft.
    - (b) Small Areas and Items: Project Consultant will designate items or areas required.
  2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
    - (a) After finishes are accepted, Project Consultant will use the room or surface to evaluate coating systems of a similar nature.
- D. Final approval of colors will be from benchmark samples.
- E. Conform to ASTM for interpretation of terms used in this Section.



- F. Labels: Do not paint over Underwriter's Laboratories (UL), Factory Mutual (FM) or other code required labels or equipment name, identification, performance rating, or nomenclature plates.
- G. Regulatory Requirements: Conform to applicable code for flame/fuel/smoke rating requirements for finishes.
- H. Single Source Responsibility: Provide primers, paints, stains and other coatings for exterior and interior items and surfaces by the same manufacturer.
- I. Lead Safety: Beginning April 22, 2010, federal law (EPA's Final Rule 40 CFR Part 745) shall require that contractors and renovators performing renovation, repair, and painting projects that disturb lead based paint in homes, child care facilities, and schools built before 1978 that a child under age 6 visits regularly, to be certified and follow lead-safe work practices to prevent lead contamination. Contractors and renovators must be EPA Certified, and projects must comply with the EPA manual "Renovate Right, Important Lead Hazard Information for Families, Child Care Providers and Schools".

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.
  - 7. Color name and number.
  - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 degrees F and a maximum temperature of 90 degrees F. Maintain storage containers in a clean condition, free of foreign materials and residue.
  - 1. Keep storage area neat and orderly. Remove oily rags and waste daily.
- C. Container Labeling: Include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing.
- D. Store and mix materials in 1 area only.
- E. Comply with health and fire regulations. Take precautionary measures to prevent fire hazards and spontaneous combustion.

## **1.8 PROJECT CONDITIONS**

- A. Allow sufficient time for stucco and plaster to moist cure in accordance with Section 09220-Portland Cement Plaster (Stucco). The pH factor and moisture level of all areas to receive primer or paint shall be tested and confirmed.
  - 1. pH factor shall be below 10.
  - 2. Moisture content shall be below 80.
  - 3. Provide a written record of each such test.
  - 4. "Hot" primer shall not be permitted until the pH is below 10.
- B. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
- C. Do not do any painting if the relative humidity exceeds 90 percent.
- D. Do not apply finish in areas where dust is being generated.
- E. Cover or otherwise protect finished work of other trades and surfaces not being painted concurrently or not to be painted.
- F. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
- G. Provide continuous ventilation to maintain surface and ambient temperatures 24 hours before, during and 48 hours after painting.
- H. Provide lighting levels of 50 foot-candles at mid-height at substrate surface.

**1.9 WARRANTY**

- A. Provide a written guarantee, co-signed jointly and severally by the Contractor, painting subcontractor, and materials manufacturers, against cracking, peeling flaking, chalking and mildew on interior surfaces, and additionally against erosion and unreasonable fading or exterior surfaces, for 8 years; agreeing to repair and repaint surfaces affected by such defects, at no cost to the Owner, including necessary removal or protection of other work, without limit, within 30 days after notification by the Owner, and to perform such work based on the provisions of this section, including extension of the guarantee to cover new work.

**1.10 EXTRA STOCK**

- A. Provide "Home Store" data (where painter purchased the paints used on the project) include all paint records and the following Home Store information:
  - 1. Name.
  - 2. Address.
  - 3. Telephone number.
  - 4. Store manager name.
  - 5. List of paints purchased by name and type.

- B. Provide a 1-gallon container of each color and surface texture of respective finish paints used on the project.
- C. Label each container with color, texture and room locations, in addition to the manufacturer's label.
- D. Deliver and store extra stock at the time of substantial completion.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. The Florida School Plant Management Association's Certified Products List shall serve as a minimum guideline.
- B. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
  - 1. Benjamin Moore & Co.
  - 2. Coronado Paint Co.
  - 3. PPG Architectural Finishes, Inc.
  - 4. (Basis of Design) Sherwin-Williams Company.

### **2.2 PAINT MATERIALS, GENERAL**

- A. All scope of work shall use selected manufacturer's complete paint system.
- B. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
  - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers.
- D. Colors: As selected by Project Consultant in consultation with Owner.
- E. Millage noted below is minimum acceptable dry film thickness per coat application.
- F. Toxicity/IEQ: All interior paint and coating products are to comply with the GREENGUARD Product Emission Standard for Children & Schools or any of the following which apply:

1. All architectural paints, coatings, and primers applied to interior walls and ceilings are to comply with the Green Seal Standard GS-11, First Edition, May 20, 1993.
2. All anti-corrosive and anti-rust paints applied to interior metal ferrous surfaces are to comply with Green Seal Standard GS-03, Second Edition, January 7, 1997.

### 2.3 VOC CONTENT

- A. Products are specified must not exceed the following:
  1. Interior Coatings (weight in grams/liter of product):
    - (a) Non-Flat: 150.
    - (b) Flat: 50.
  2. Exterior Coatings weight in grams/liter of product minus water):
    - (a) Non-Flat: 200.
    - (b) Flat: 100.

### 2.4 CONCRETE UNIT MASONRY BLOCK FILLERS

- A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.
  1. Sherwin-Williams; PrepRite Block Filler (B25W25): Applied at a dry film thickness of not less than 8 mils per coat.
    - (a) Meets GS-11.
    - (b) Meets MPI MP-33.1 Block Filler, Latex-Base, Interior-Exterior Flat, White.

### 2.5 EXTERIOR PRIMERS

- A. Exterior Concrete and Masonry Primer-New Construction: Factory-formulated alkali-resistant acrylic-latex primer for exterior application.
  1. Sherwin-Williams; Loxon Acrylic Primer (A24W300): Applied at a dry film thickness of not less than 3.2 mils per coat.
- B. Exterior Concrete and Masonry Primer-for Elastomeric Coatings: Factory-formulated alkali-resistant acrylic-latex primer for exterior application
  1. Sherwin-Williams; Loxon Acrylic Primer (A24W8300): Hot Stucco Applied at a dry film thickness of not less than 3.2 mils per coat.
- C. Exterior Concrete and Masonry Primer-for Existing Construction: Factory-formulated alkali-resistant Acrylic primer for exterior application
  1. Sherwin-Williams; Loxon Conditioner (A24W1100): Applied at a spread rate of 300-400 square feet per gallon.
- D. Exterior Wood Primer for Acrylic Enamels: Factory-formulated alkyd or latex wood primer for exterior application.
  1. Sherwin-Williams: PrepRite ProBlock Interior/Exterior Latex Primer/Sealer (B51W620): Applied at a dry film thickness of not less than 2.3 mils per coat.

or

2. Sherwin-Williams: PrepRite ProBlock Interior/Exterior Latex Primer/Sealer (B51W620): Applied at a dry film thickness of not less than 1.4 mils per coat.
- E. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.
    1. Sherwin-Williams; Pro-Cryl Universal Primer (B66-310 Series): Applied at a dry film thickness of not less than 2.0 mils per coat (acrylic-based).
      - (a) Meets GS-11.
      - (b) Meets MPI MP-26.3 "Recommended Primer" under Sherwin-Williams DTM Acrylic Gloss Coating (B66 Series).
  - F. Exterior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer for exterior application.
    1. Sherwin-Williams; Pro-Cryl Universal Primer (B66-310 Series): Applied at a dry film thickness of not less than 2.0 mils per coat.
      - (a) Meets GS-11.
      - (b) Meets MPI MP-26.3 "Recommended Primer" under Sherwin-Williams DTM Acrylic Gloss Coating (B66 Series).
  - G. Exterior Aluminum Primer under Acrylic Finishes: Factory-formulated acrylic-based metal primer for exterior application.
    1. Sherwin-Williams; Pro-Cryl Universal Primer (B66-310 Series): Applied at a dry film thickness of not less than 2.0 mils per coat.
      - (a) Meets GS-11.
      - (b) Meets MPI MP-26.3 "Recommended Primer" under Sherwin-Williams DTM Acrylic Gloss Coating (B66 Series).

## 2.6 INTERIOR PRIMERS

- A. Interior Concrete, Masonry, and Brick Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
  1. Sherwin-Williams; Promar 200 Low VOC Interior Latex Primer (B28W600): Applied at a dry film thickness of not less than 1.5 mils per coat.
    - (a) Meets GS-11.
- B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
  1. Sherwin-Williams; Promar 200 Low VOC Interior Latex Primer (B28W600): Applied at a dry film thickness of not less than 1.5 mils per coat.
    - (a) Meets GS-11.
- C. Interior Plaster Primer: Factory-formulated latex-based primer for interior application.
  1. Sherwin-Williams; Promar 200 Low VOC Interior Latex Primer (B28W600): Applied at a dry film thickness of not less than 1.5 mils per coat.
    - (a) Meets GS-11.

- D. Interior Wood Primer for Acrylic-Enamel: Factory-formulated acrylic-latex-based interior wood primer.
  - 1. Sherwin-Williams; Harmony Interior Latex Primer (B09W Series): Applied at a dry film thickness of not less than 1.3 mils per coat.
    - (a) Meets GS-11.
    - or
  - 2. Sherwin-Williams: PrepRite ProBlock Latex Primer, B51 Series (4 milswet, 1.4 mils dry)
  
- E. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
  - 1. Sherwin-Williams; Pro-Cryl Universal Primer (B66-310 Series): Applied at a dry film thickness of not less than 2.0 mils per coat.
  
- F. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
  - 1. Sherwin-Williams: Pro-Cryl Universal Primer (B66-310 Series): Applied at a dry film thickness of not less than 2.0 mils per coat.
    - (a) Meets GS-11.
  
- G. Interior Unit Masonry, Gypsum Board and Plaster: Factory-formulated primer for Epoxy finish.
  - 1. Sherwin-Williams: Promar 200 Low VOC Interior Latex Primer (B28W600): Applied at a dry film thickness of not less than 1.5 mils per coat.
    - (a) Meets GS-11.

## 2.7 EXTERIOR FINISH COATS

- A. Exterior Low-Luster Acrylic Elastomeric: Factory-formulated low sheen 100% Acrylic Elastomeric coating for exterior application. **Note: Use elastomeric only after receiving approval in writing from the Owner.**
  - 1. Sherwin-Williams; SherLastic Elastomeric Coating (A5-100 Series): Applied at a dry film thickness of not less than 6.0 mils per coat.
  
- B. Exterior Low-Luster Acrylic Paint: Factory-formulated low-sheen (eggshell) acrylic-latex paint for exterior application.
  - 1. Sherwin-Williams; A-100 Exterior Latex Satin (A82 Series): Applied at a dry film thickness of not less than 1.3 mils per coat.
  
- C. Exterior Semi-gloss Acrylic Enamel: Factory-formulated semi-gloss waterborne acrylic-latex enamel for exterior application.
  - 1. Sherwin-Williams: DTM Acrylic Coating (B66-200 Series–Semi-gloss) Applied at a dry film thickness of not less than 2.5 mils per coat.
  
- D. Exterior Full-Gloss Acrylic Enamel for Ferrous and Other Metals: Factory-formulated full-gloss waterborne acrylic-latex enamel for exterior application.
  - 1. Sherwin-Williams; DTM Acrylic Coating (B66-100 Series-Gloss): Applied at a dry film thickness of not less than 2.5 mils per coat.
    - (a) Meets GS-11.

- (b) Meets MPI MP-26.3 Acrylic-Base Gloss Enamel, Metal Surfaces, Whites and Tints.

## 2.8 INTERIOR FINISH COATS

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
  - 1. Sherwin-Williams: Promar 200 Low VOC Interior Latex Flat (B30-600 Series): Applied at a dry film thickness of not less than 1.3 mils per coat.
    - (a) Meets GS-11.
- B. Interior Flat Latex-Emulsion Size: Factory-formulated flat latex-based interior paint.
  - 1. Sherwin-Williams: Harmony Interior Latex Flat (B5 Series): Applied at a dry film thickness of not less than 1.7 mils per coat.
    - (a) Meets GS-11.
- C. Interior Low Luster Latex Paint: Factory-formulated eggshell latex based interior paint.
  - 1. Sherwin-Williams: Harmony Interior Latex Eg-Shel (B9 Series): Applied at a dry film thickness of not less than 1.6 mils per coat.
    - (a) Meets GS-11.
- D. Interior Low-Luster Acrylic Enamel:
  - 1. Sherwin-Williams: Promar 200 Low VOC Interior Latex Eg-Shel (B20-600 Series): Applied at a dry film thickness of not less than 1.7 mils per coat.
    - (a) Meets GS-11.
- E. Interior Semi-gloss Acrylic Enamel: Factory-formulated semi-gloss acrylic-latex enamel for interior application.
  - 1. Sherwin-Williams; Promar 200 Interior Latex Semi-Gloss (B31-600 Series): Applied at a dry film thickness not less than 1.6 mils per coat.
    - (a) Meets GS-11.
- F. Interior Full-Gloss Acrylic Enamel:
  - 1. Sherwin-Williams: Pro Industrial Zero VOC Acrylic Gloss (B66W600): Applied at a dry film thickness of not less than 2.5 mils per coat.
- G. Interior Semi-gloss Waterborne Acrylic Epoxy: Factory-formulated semi-gloss acrylic epoxy coating of interior application.
  - 1. Sherwin-Williams: Water-Based Catalyzed Epoxy (Two Component) (B70W211/B60V15): Applied at a dry film thickness of not less than 2.5 mils per coat.
  - 2. S-W Pro Industrial Pre-Catalyzed Water-based Epoxy, K46W150 Series.
    - (a) Meets GS-11.
  - 3. Benjamin Moore: IMC Acrylic Epoxy Coating-Semi-Gloss (M43/M44-86). Applied at a dry film thickness of not less than 1.5 mils.

## **2.9 INTERIOR WOOD STAINS AND VARNISHES**

- A. Open-Grain Wood Filler: Factory-formulated paste wood filler applied at spreading rate recommended by manufacturer.
  - 1. Sherwin-Williams: Sher-Wood Natural Filler (D70T1).
- B. Interior Wood Stain: Factory-formulated alkyd-based penetrating wood stain for interior application applied at spreading rate recommended by manufacturer.
  - 1. Sherwin-Williams: Minwax 250 VOC Wood Stain
- C. Interior Waterborne Clear Satin Varnish: Factory-formulated clear satin acrylic-based polyurethane varnish applied at spreading rate recommended by manufacturer.
  - 1. 2 Coats-Sherwin-Williams: Wood Classics Waterborne Polyurethane Varnish-Satin (A68 Series): Applied at a dry film thickness of not less than 0.8 mils per coat.
- D. Interior Waterborne Stain Full-Gloss Varnish:
  - 1. 2 Coats-Sherwin-Williams; Wood Classics Waterborne Polyurethane Varnish-Gloss (A68 Series): Applied at a dry film thickness of not less than 0.8 mils per coat.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
  - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

### **3.2 PREPARATION**

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.



- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
  
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
  - 1. Provide pull tests on existing painted surfaces where a different coating will be applied. Verify with the manufacturer that the coatings are compatible.
  - 2. Provide barrier coats over incompatible primers or remove and reprime.
  - 3. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - (a) Use abrasive blast-cleaning methods if recommended by paint manufacturer.
    - (b) Determine alkalinity pH and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition by approved curing methods in Section 09220-Portland Cement (Stucco). Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
    - (c) Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
  - 4. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
    - (a) Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
    - (b) Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
    - (c) If transparent finish is required, back prime with non-yellowing varnish.
    - (d) Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
    - (e) Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
  - 5. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods

that comply with the Steel Structures Painting Counsel's recommendations.

- (a) Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
  - (b) Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
  - (c) Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment or "passivators" from galvanized sheet metal fabricated from coil stock by mechanical methods SSPC-SP 7.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### **3.3 APPLICATION**

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
  2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  3. Provide finish coats that are compatible with primers used.
  4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
  5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment and furniture with prime coat only.
  6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.

7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
  9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
  10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. Omit primer over metal surfaces that have been shop primed and touchup painted.
  3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
  2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
  3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
1. Uninsulated metal piping.
  2. Uninsulated plastic piping.
  3. Pipe hangers and supports.
  4. Tanks that do not have factory-applied final finishes.

5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
  6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
  7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Switchgear.
  2. Panelboards.
  3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no bleed-through or other defects due to insufficient application of sealer or primer.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats.
- L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

#### **3.4 FIELD QUALITY CONTROL**

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
  2. Testing agency will perform appropriate tests as required by Owner

3. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

### **3.5 CLEANING**

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
  1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.
- B. Remove all spilled, splashed or splattered paint from all surfaces. Leave entire project in a clean condition.
- C. Place scrapings, empty cans, consumed brushes, etc. in plastic bags and dispose of in the proper manner by the Contractor. Place used mineral spirits and other hazardous liquids in an appropriate container and is the responsibility of the Contractor to properly dispose of in full compliance of E.P.A., rules and regulations.
- D. Do not mar surface finish by cleaning.
- E. Leave entire project in a clean condition.

### **3.6 PROTECTION**

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
  1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

### **3.7 EXTERIOR PAINT SCHEDULE** (provide the following finish systems) as part of the system selected:

- A. Concrete, Stucco, and Brick: Unless specialty finish is noted:
  1. Low-Luster Acrylic Paint:
    - (a) Primer: Exterior concrete and masonry primer.
    - (b) Finish: 2 coats Exterior low-luster acrylic paint.
  2. Semi-gloss Acrylic-Enamel:
    - (a) Primer: Exterior concrete and masonry primer.

- (b) Finish: 2 coats Exterior semi-gloss acrylic enamel.
- 3. Low Luster Acrylic Elastomeric:
  - (a) Primer/Sealer: Latex masonry sealer
  - (b) Finish: 2 coats Low luster Acrylic elastomeric waterproof coating.

B. Concrete Unit Masonry:

- 1. Low-Luster Acrylic Paint:
  - (a) Block Filler: Concrete unit masonry block filler.
  - (b) Finish: 2 coats Exterior low-luster acrylic paint.
- 2. Semi-gloss Acrylic-Enamel:
  - (a) Block Filler: Concrete unit masonry block filler.
  - (b) Finish: 2 coats Exterior semi-gloss acrylic enamel.
- 3. Low Luster Acrylic Elastomeric:
  - (a) Primer/Sealer: Alkyd masonry sealer
  - (b) Finish: 2 coats Low luster Acrylic elastomeric waterproof coating

C. Ferrous-Metal: Primer is not required on shop-primed items.

- 1. Full-Gloss Acrylic-Enamel:
  - (a) Primer: Exterior ferrous-metal primer.
  - (b) Finish: 2 coats Exterior full-gloss acrylic enamel for ferrous and other metals.
- 2. Semi-gloss Acrylic-Enamel:
  - (a) Primer: Exterior ferrous-metal primer
  - (b) Finish: 2 coats Exterior semi-gloss acrylic enamel for ferrous and other metals.

D. Zinc-Coated Metal:

- 1. Full-Gloss Acrylic-Enamel:
  - (a) Primer: Exterior galvanized metal primer.
  - (b) Finish: 2 coats Exterior full-gloss acrylic enamel for ferrous and other metals.
- 2. Semi-gloss Acrylic-Enamel:
  - (a) Primer: Exterior ferrous-metal primer
  - (b) Finish: 2 coats Exterior semi-gloss acrylic enamel for ferrous and other metals.

E. Aluminum: Provide the following finish systems over exterior aluminum surfaces:

- 1. Full-Gloss Acrylic-Enamel Finish:
  - (a) Primer: Exterior aluminum primer under acrylic finishes.
  - (b) Finish: 2 coats Exterior full-gloss acrylic enamel for ferrous and other metals.
- 2. Semi-gloss Acrylic-Enamel Finish:
  - (a) Primer: Exterior aluminum primer under acrylic finishes
  - (b) Finish: 2 coats Exterior semi-gloss acrylic enamel for ferrous and other metals.

F. Wood:

- 1. Low-Luster Acrylic Paint:

- (a) Primer: Exterior concrete and masonry primer.
- (b) Finish: 2 coats Exterior low-luster acrylic paint.
- 2. Low Luster Acrylic Elastomeric:
  - (a) Primer/Sealer: Latex masonry sealer
  - (b) Finish: 2 coats Low luster Acrylic elastomeric waterproof coating.

### 3.8 INTERIOR PAINT SCHEDULE

#### A. Concrete and Brick:

- 1. Low-Luster Acrylic-Enamel: (ceilings and soffits).
  - (a) Primer: Interior concrete and masonry primer.
  - (b) Finish: 2 coats Interior low-luster acrylic enamel.
- 2. Semi-gloss Acrylic-Enamel:
  - (a) Primer: Interior concrete and masonry primer.
  - (b) Finish: 2 coats Interior semi-gloss acrylic enamel.

#### B. Concrete Unit Masonry:

- 1. Semi-gloss Acrylic-Enamel:
  - (a) Block Filler: Concrete unit masonry block filler.
  - (b) Finish: 2 coats Interior semi-gloss acrylic enamel.

#### C. Concrete Unit Masonry, Gypsum Board and Plaster:

- 1. Semi-gloss Waterborne Acrylic Epoxy:
  - (a) Primer: Epoxy primer.
  - (b) Finish: 2 coats waterborne semi-gloss Acrylic Epoxy Coating.

#### D. Gypsum Board:

- 1. Low-Luster Acrylic-Enamel: (ceilings and soffits).
  - (a) Primer: Interior gypsum board primer.
  - (b) Finish: 2 coats Interior low-luster acrylic enamel.
- 2. Semi-gloss Acrylic-Enamel Finish:
  - (a) Primer: Interior gypsum board primer.
  - (b) Finish: 2 coats Interior semi-gloss acrylic enamel.

#### E. Plaster:

- 1. Low-Luster Acrylic-Enamel: (ceilings and soffits).
  - (a) Primer: Interior plaster primer.
  - (b) Finish: 2 coats Interior low-luster acrylic enamel.
- 2. Semi-gloss Acrylic-Enamel Finish:
  - (a) Primer: Interior plaster primer.
  - (b) Finish: 2 coats Interior semi-gloss acrylic enamel.

#### F. Acoustical Plaster:

- 1. Flat Acrylic-Latex Finish:
  - (a) Finish: 2 coats Interior flat acrylic paint.

#### G. Wood:

- 1. Semi-gloss Acrylic-Enamel:
  - (a) Primer: Interior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes.

- (b) Finish: 2 coats Interior semi-gloss acrylic enamel.
  - 2. Full-Gloss Acrylic-Enamel:
    - (a) Primer: Interior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes.
    - (b) Finish: 2 coats Interior full-gloss acrylic enamel.
- H. Ferrous-Metal:
  - 1. Full-Gloss Acrylic-Enamel:
    - (a) Primer: Interior ferrous-metal primer.
    - (b) Finish: 2 coats Interior full-gloss acrylic enamel.
  - 2. Semi-gloss Acrylic-Enamel:
    - (a) Primer: Interior ferrous-metal primer.
    - (b) Finish: 2 coats Interior semi-gloss acrylic enamel.
- I. Zinc-Coated Metal:
  - 1. Full-Gloss Acrylic-Enamel:
    - (a) Primer: Interior zinc-coated metal primer.
    - (b) Finish: 2 coats Interior full-gloss acrylic enamel.
  - 2. Semi-gloss Acrylic-Enamel:
    - (a) Primer: Interior zinc-coated metal primer.
    - (b) Finish: 2 coats Interior semi-gloss acrylic enamel.
- J. All-Service Jacket over Insulation:
  - 1. Flat Acrylic Finish: Add fungicidal agent to render fabric mildew proof.
    - (a) Finish: 2 coats Interior flat latex-emulsion size.

### 3.9 INTERIOR STAIN AND NATURAL-FINISH WOODWORK SCHEDULE

- A. Stained Woodwork:
  - 1. Waterborne Clear Satin-Varnish: Wipe wood filler before applying stain.
    - (a) Filler: Open-grain wood filler.
    - (b) Stain: Interior wood stain.
    - (c) Finish: 2 coats Interior waterborne clear satin varnish.
  - 2. Waterborne Stain Full-Gloss Varnish Finish: Wipe filler before applying stain.
    - (a) Filler: Open-grain wood filler.
    - (b) Stain: Interior wood stain.
    - (c) Finish: 2 coats Interior waterborne clear gloss varnish.
- B. Natural-Finish Woodwork:
  - 1. Waterborne Clear Satin-Varnish: Wipe wood filler before applying stain.
    - (a) Filler: Open-grain wood filler.
    - (b) Finish: 2 coats Interior waterborne clear satin varnish.
  - 2. Waterborne Full-Gloss Varnish: Wipe filler before applying stain.
    - (a) Filler: Open-grain wood filler.
    - (b) Finish: 2 coats Interior waterborne clear gloss varnish.

**END OF SECTION**



## SECTION 10100

### VISUAL DISPLAY BOARDS and CASES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Types of visual display boards specified in this section include, but are not limited to, the following:
  - 1. Porcelain enamel markerboards (both "white" and color surface).
  - 2. Vinyl fabric-faced cork tackboards.
  - 3. Display cases, surfaced-mounted.
  - 4. Display cases, free-standing.
  - 5. Bulletin board cabinets.
  - 6. Accessories.

##### 1.2 REFERENCES

- A. Aluminum Association (AA).
- B. ANSI 208.1-American National Standard Institute for Particleboard.
- C. ASTM E84-Surface Burning Characteristics of Building Materials.
- D. GREENGUARD Product Emission Standard for Children & Schools.
- E. National Association of Architectural Metal Manufacturers (NAAMM).
- F. California Department of Health Services Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of visual display board, submit manufacturer's technical data and installation instruction for each material and component part, including data substantiating that material comply with requirements.
  - 1. Low Emitting Materials.
    - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
    - (b) Submit manufacturer's certification that all products comply with Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services or GREENGUARD Product Emission Standard for Children & Schools.
  - 2. Recycled Content:

- (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
  - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
  - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
  - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Shop Drawings: Provide shop drawings for each type of visual display board required. Include sections of typical trim members and dimensions elevations. Show anchors, grounds reinforcement, accessories, layout, required clearances and installation details.
  - C. Samples: Submit full range of color samples for each type of visual display board, trim and accessories required. Provide 12 inches square samples of sheet materials and 12 inches lengths of trim members for color verification after selections have been made.
  - D. Certification: Submit manufacturer's certification that material furnished for project comply with the specified requirements.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer: Unless otherwise acceptable to Project Consultant, furnish all chalkboards and tackboards by one manufacturer for entire project.
- B. Provide manufacturer's identification label, minimum 0.040 inch aluminum, permanent affixed with adhesive at lower right hand corner of aluminum trim on each individually framed markerboard or tackboard.
- C. Markerboards that are not cleanable, and markerboards damage during installation shall be replaced at no additional cost to the Owner.
- D. Conform to applicable code for flame/smoke rating for vinyl fabric covered tackboards and tackboard surface covering under provisions of ASTM E84.
- E. Conform to SREF.

#### **1.5 PROJECT CONDITIONS**

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.
- B. Allow for trimming and fitting wherever taking field measurements before fabrication might delay the work.

## **1.6 WARRANTY**

- A. Porcelain Enamel Markerboard Warranty: Provide manufacturer's standard one year labor, minimum 50 year material written warranty, agreeing to replace, porcelain enamel markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking or flaking, provided manufacturer's instructions with regard to handling, installation, protection and maintenance have been followed.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
  - 1. Manufacturers of Porcelain Enamel Markerboards, Tackboards, Display Cases and Bulletin Board Cabinets:
    - (a) AARCO Products, Inc.
    - (b) ADP Lemco, Inc.
    - (c) American Visual Display Products, LLC
    - (d) Best-Rite Manufacturing.
    - (e) (Basis of Design) Claridge Products and Equipment, Inc.

### **2.2 MATERIALS**

- A. All marker board materials shall contain recycled content.

### **2.3 PORCELAIN ENAMEL MARKERBOARDS**

- A. Provide balanced, high pressure laminated porcelain enamel writing surface of 3-ply construction consisting of facing sheet, core material and backing.
- B. Facing sheets: Provide facing sheet of minimum 24 gage or 28 gage enameling grade steel sheet specially processed for temperatures used in coating porcelain on steel. Coat the exposed face concealed face with 3-coat process consisting of primer, ground coat and color cover coat, and the concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to the steel at the manufacturer's standard firing temperature, but not less than 1,200 F.
  - 1. Cover Coat: Provide the manufacturer's standard "brown" matte finish cover coat.
  - 2. Cover coat (for Dry Erase Units): Provide the manufacturer's standard "white" special writing surface with low-gloss finish intended for use with liquid felt tipped markers.
- C. Fixed Panel Core: Complying with the requirements of ANSI A208.1, Grade 1-M-1.
  - 1. 24 Gage Facing Sheet: Provide 7/16 inch thick "Duracore" fiberboard.
  - 2. 28 Gage Facing Sheet: Provide 1/2 inch thick particleboard.

- D. Backing Sheet: 0.015 inch thick moisture resistant aluminum backing sheet.
- E. Laminating Adhesive:
  1. Provide the manufacturer's standard moisture-resistant thermoplastic type adhesive.
- A. VOC content of all adhesives shall comply with California Department of Health Services Standard Practice for The Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda or GREENGUARD Product Emission Standard for Children & Schools.
- B. Attachment and Trim: Provide mounting clips at top and bottom that holds panel off of wall for ventilation, and provide side trim fully concealing edge.

## **2.4 TACKBOARDS**

- A. Vinyl Fabric-Faced Tackboards: Provide mildew resistant, washable, vinyl fabric complying with FS CCC-W-408, Type II, mildew resistant, laminated to 1/4 inch thick cork core sheet. Provide only fabric that has a flame spread rating of 25 or less when tested in accordance with the requirements of ASTM E 84.
- B. Provide color and texture as scheduled or as selected by Project Consultant from manufacturer's standards.
- C. Backing: Make panels rigid by factory laminating cork face sheet under pressure to four ply 1/4 inch thick tempered hardboard backing.
- D. Attachment and Trim: Provide angle mounting clips at top and bottom with side trim fully concealing edge.

## **2.5 DISPLAY**

- A. Freestanding Display Cases: Provide units with the following features:
  1. Approximate Dimensions: 5'-6" H x 6'-0" W x 1'-4" D.
  2. Base: 18-inches, high with oak grained finish.
  3. Heavy-gage extruded aluminum construction.
  4. Finish: Satin anodized.
  5. Back Panel: Manufacturer's standard fabric covered cork panel. Color as selected by Project Consultant.
  6. Tempered glass sliding glass doors with locks.
  7. Adjustable Shelves: Three, tempered glass, 10 inches wide, with brackets.
- B. Surface Mounted Display Cases: Provide units with the following salient features:
  1. Approximate Dimensions: 48 inches H x 72 inches W; Inside depth of case 1-5/8 inches.
  2. Heavy gage 3-1/4 inch aluminum construction.
  3. Finish: Satin anodized.

4. Back Panel: Manufacturer's standard D-R grooved cork panel. Color as selected by Project Consultant.
5. Tempered glass sliding glass doors with flat key tumbler locks.
6. Attachment Z-Bar hangers.
7. No head panel required.

## 2.6 BULLETIN BOARD CABINETS

- A. Surface Mounted Bulletin Board Cabinets: Provide tempered glass units with the following salient features:
  1. 1 inch x 3 inch hollow tube perimeter frame.
  2. Dimensions: 48 inches x 72 inches 3/4 inch deep.
  3. Attachment Z-bar hangers.
  4. Finish: Satin Anodized.
  5. Basis of Design: Claridge Revere Series Model #U4420B with "Hook Fab" rear panels in color #927 "Platinum Gray".

## 2.7 ACCESSORIES

- A. Metal Trim and Accessories: Fabricated frames and trim of not less than 0.062 inches thick 6063 aluminum alloy T5 temper, size and shape as indicated, to suit type of installation. Provide straight, single-length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure.
  1. Where the size of boards or other conditions exist which require support in addition to the normal trim, provide structural supports or modify the trim as indicated, or as selected by the Project Consultant from the manufacturer's standard structural support accessories to suit the condition indicated.
  2. Field Applied Trim: For fixed panels, provide the manufacturer's standard concealed screw-on or clip-on trim in profiles indicated.
- B. Chalk/Markerboard Chalktray: Furnish the manufacturer's standard continuous, solid extrusion-type aluminum chalktray with horizontal ribbed section, flat vertical face at front, and aluminum end cap closures or 3/4 inch radiused corners for each chalkboard.
- C. Map Rail: Furnish map rail at the top of units 2 inch high as indicated, complete with the following accessories:
  1. End Stops: Provide one end stop at each end of the map rail.
  2. Map and Projection Screen Hooks: Provide 2 map hooks with flexible metal clips for each 4 feet of map rail of fraction thereof, but in no case less than 4 map hooks per unit.
  3. Display Rail: Provide cork inserts where indicated on drawings.
  4. Flag Holder: Provide 2 holders per map rail; 1 inch length.

## 2.8 FABRICATION

- A. Porcelain Enamel Markerboards: Laminated facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.

- B. Assembly: Provide factory-assembled markerboard and tackboard units, except where field-assembled units are required.
- C. Make joints only where the total length exceeds the maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Project Consultant.
  - 1. Provide the manufacturer's concealed vertical joint system between abutting sections of chalkboard. Provide completely flush-fitting panels with tight hairline joins free of rust and raw or ragged edges.

## **2.9 FINISHES**

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendation relative to application and designations of finishes.
- B. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. Class II Clear Anodized Finish: Furnish exposed aluminum trim, accessories and fasteners with the manufacturer's standard satin anodized finish with clear anodic coating complying with AA-M12C22A31; minimum film thickness 0.4 mil.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.
- B. Coordinate with location of "Smart" Board (or other manufacturer) for placement of marker board (these boards may differ in size with different manufacturers).

### **3.2 INSTALLATION**

- A. Deliver factory-built markerboard and tackboard units completely assembled in one piece without joints, wherever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Project Consultant. When overall dimensions require delivery in separate unit, pre-fit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.
- B. Install units at mounting heights indicated by Ed Specs, drawings, and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for a complete installation.

- C. When units are installed on exterior walls, provide continuous 3/4 inch ventilation space between back-up wall and visual display board units to avoid moisture condensation.
- D. Coordinate job site assembled units with grounds, trim, and accessories. Join all parts with a neat, precision fit.
- E. Verify that manufacturer's optional accessories will fit finished display rail installation. Coordinate required modifications with Project Consultant, such as notching or rail.

### **3.3 ADJUST AND CLEAN**

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean surfaces and trim in accordance with the manufacturer's printed instructions leaving ready for use.
- C. Provide manufacturer's written information on proper writing markers and cleaning instructions.

**END OF SECTION**

## SECTION 10165

### PLASTIC TOILET PARTITIONS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Toilet compartments including toilet partitions, and urinal screens, complete with hardware.
- B. Related Sections:
  - 1. Section 01572-Construction Waste Management
  - 2. Section 06100-Rough Carpentry for blocking.
  - 3. Section 09250-Gypsum Board for bracing.
  - 4. Section 10810-Toilet Accessories.

##### 1.2 REFERENCES

- A. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. International Organization for Standardization (ISO) 14021 – 1999; Environmental Labels and Declarations

##### 1.3 SUBMITTALS

- A. Shop Drawings: Indicate dimensioned partition plans, elevations, details, swings of doors, color, location of hardware items, and required wall blocking. Labels components and fully describe anchorage devices and substrates. Show relationship to plumbing fixtures.
- B. Product Data: Indicate details of construction, assembly and anchorage to building construction; manufacturer's specifications including description of hardware; maintenance instructions. Include test reports confirming specified interior finish class and toxicity requirements.
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- C. Sample: Six-inch sample of panel material in both stock and custom colors. Include sample of fastener and shield for wall bracket anchorage.
- D. Certification: Provide certification that solid plastic partitions, hardware, headrail, and wall brackets delivered to site comply with requirements of ASTM E84 for specified interior finishes, or better for flame spread, smoke developed rating listed in Article below.



- E. Installer Certification: Provide documentation from the toilet partition manufacturer that installers have been factory-trained in the installation of these partitions.
- F. Warranty: Copy of manufacturer's warranty.

#### **1.4 QUALITY ASSURANCE**

- A. Mock-Up: Required. Approval by Project Consultant required before ordering, production, or delivery of remaining partitions.

#### **1.5 PRODUCT DELIVERY, HANDLING and STORAGE**

- A. Ship components with protective wrap. Store and handle in accordance with manufacturer's printed instructions.
- B. Store to avoid warping of panels, pilasters, or doors.

#### **1.6 WARRANTY**

- A. Manufacturer's standard fifteen-year minimum warranty submitted with shop drawings, guaranteeing against material defects or faulty fabrication, assembly and installation. Upon completion of installation submit warranty for ten-years starting at date of acceptance by Owner stating that failed product or installation shall be replaced at no additional cost to Owner.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
  - 1. Columbia Partitions a Division of PSISC (Partition Systems Inc. of South Carolina).
  - 2. Metpar Corp.
  - 3. Scranton Products (Santana, Comtec & Capital).

#### **2.2 MATERIALS**

- A. All plastic toilet partition products are to contain recycled content.

#### **2.3 SOLID PLASTIC TOILET PARTITIONS**

- A. Floor mounted overhead braced solid-plastic, through-color partitions. Panels, pilasters, and doors shall be 1-inch thick, seamless, fabricated from High Density Polyethylene (HDPE) which is waterproof, non-absorbent and has a self-lubricating surface that resists marking with pens, pencils or other writing utensils. Color shall be selected from manufacturer's standard or custom colors. All edges shall be machined to a 0.250-inch radius. Phenolic resin construction is not acceptable.
  - 1. Plastic material shall comply with the following:
    - (a) Interior Finish Class: Class C, Flame Spread of 76-200 and Smoke Developed of 0-450 when tested in accordance with ASTM E84.
    - (b) Products of combustion of "no more toxic" than those from burning wood when tested in accordance with ASTM E84.

- (c) Integral color shall be uniform throughout panel and all panels shall match.

B. Hardware:

1. Head Rail: Heavy aluminum extrusion (6463-T5 Alloy) with clear anodized finish. Fasten to tops of pilasters and head rail brackets by thru bolting with star-head security pin, stainless steel barrel bolts.
2. Head Rail Brackets: Stainless steel. Secure to wall with stainless steel tamper resistant torx head screws.
3. Hinges: Doubled knuckle 8 inch heavy-duty aluminum alloy with clear anodized finish, have wrap around flanges and thru bolted to doors and pilasters. Doors shall be furnished complete with necessary wall bumpers, door pulls, 6 inch heavy-duty door strikes, keepers and latch housing. External supplementary door pulls and 2 doorstops for handicap stalls.
4. Door Strike and Keeper: 6 inch long, heavy-duty extruded aluminum (6436-T5 alloy) secured to the pilaster with stainless steel tamper resistant torx head sex bolts. Bumper shall be made of extruded black vinyl.
5. Latch and Housing: Heavy-duty extruded aluminum (6463-T5 alloy). Latch housing shall be bright dip anodized finish and slide bolt and button black anodized finish.
6. Wall brackets: 54 inch high and shall be anodized aluminum. Through-bolt brackets to panels and pilasters with sex bolts. Wall brackets shall be used for panel and pilasters, pilasters to wall and panel to wall connections. Secure with stainless steel tamper resistant torx head sex bolts.
7. Pilaster Shoes and Fasteners: Plastic, same type and color as plastic panels. Secure to pilaster with tamper resistant stainless steel torx sex bolts.
8. Door pulls and coat hook/doorstops: Chrome-plated zamac, or stainless steel.
9. Finish of exposed portion of screws, bolts and nuts shall match finish of attached hardware item. Sex bolts shall be plastic barrel nut and shoulder screws with tamperproof head. Color to match bracket.
10. Aluminum heat sink edging strips to be fastened to the bottom edge of all doors and panels using vandal-proof stainless steel fasteners.

C. Anchorages:

1. Connecting to wall shall provide a rigid and durable anchorage to wall construction. Use minimum 2-1/2 inches long Torx Head stainless steel screws for attachment into concealed wood blocking. Finish of exposed portions shall match finish of wall brackets.
2. Plastic or metal shields will not be accepted. Secure into metal or wood grounds solidly fastened to wall structure.

## 2.4 FABRICATION

- A. Fabricated Compartments and Urinal Screens to the following Configuration. Dividing panels, and doors shall be 55 inches high and with bottom edge 12 inches from the floor. Urinal privacy screens shall be 18 inches deep and floor mount, height to match water closet partitions.
- B. Use template provided by toilet accessories manufacturer, provide cutouts for recessed items.

- C. Compartments for handicapped shall be fabricated in accordance with the latest code requirement for accessibility.
- D. Coordinate location of required concealed blocking and grounds (in walls and ceiling) with toilet compartment layout, and urinal screen layout.
- E. Overhead bracing must not occur within the body of the stall. Use a floor to ceiling pilaster for bracing.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Check areas to receive partitions for correct dimensions, plumbness of walls and soundness of wall surfaces that would affect installation of holding brackets. Verify that blocking is installed in stud walls to receive partition anchorages.
- B. Verify spacing of plumbing fixtures to assure compatibility with installation of partitions.
- C. Do not begin installation of partitions until conditions are satisfactory.
- D. Warped panels, pilasters, or doors will not be accepted.

### **3.2 ERECTION**

- A. Install partitions rigid, straight, plumb and level. Follow partition manufacturer's printed installation instructions and final approved shop drawings.
- B. Provide uniform clearance of not more than 1 inch between panels and walls, and clearance of not more than 1/4 inch at vertical edges of doors uniform from top and bottom.
- C. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints wherever possible.
- D. Conceal evidence of drilling, cutting and fitting.

### **3.3 ADJUSTING and CLEANING**

- A. Set in-swinging door hinges to hold doors open at 30 degrees from closed position when unlatched and out-swinging door hinges to be self closing at zero degrees from closed position when unlatched in compliance with ADA requirements.
- B. Perform final adjustment to leveling devices and hardware.
- C. Clean exposed surfaces of partitions, hardware, fittings and accessories. Avoid soiling other adjacent finishes. Follow partition manufacturer's printed cleaning instructions.

**END OF SECTION**

## SECTION 10400

### IDENTIFYING DEVICES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Work of this Section includes, but is not limited to, the following:
  - 1. Plaque.
  - 2. Building Name Letters.
  - 3. Exterior Handicapped Signs at Parking Spaces.
  - 4. Emergency Exit Signs.
  - 5. Capacity Signs.
  - 6. Exit Route.
  - 7. Toilet Room Handicapped Signs.
  - 8. Exterior and Interior Space Number and Name Signs.
  - 9. Building Directional Signs.
  - 10. Safety Signs.

##### 1.2 RELATED SECTIONS

- A. Section 10520-Fire Protection Specialties

##### 1.3 REFERENCES

- A. Florida Building Code (FBC).
- B. Florida Department of Transportation (FDOT)-Manual of Uniform Traffic Control Devices (MUTCD).
- C. U.S. Architectural and Transportation Barriers Compliance Board, "Children Accessibility Requirements".

##### 1.4 SUBMITTALS

- A. Submit Manufacturer's technical data and installation instructions for each type of identifying device required.
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Submit shop drawings showing sign dimensions, letterform and letter heights.

- C. Submit 1 full size sample for the following identifying devices showing style, specified color, and method of attachment. If approved, sample shall be incorporated in the Work.
  - 1. Exterior /Interior space number and name signs.
  - 2. School name letter (one).
  - 3. ADA signs.
- D. Submit a comprehensive schedule of all space names and numbers for each building as well as quantities and locations of all other signs specified.
- E. Submit plaque rubbings for approval by the Owner.

## **1.5 QUALITY ASSURANCE**

- A. Comply with the following codes, standards, and specifications:
  - 1. Florida Building Code, Chapter 11.
  - 2. U.S. Architectural and Transportation Barriers Compliance Board, "Children Accessibility Requirements".

## **1.6 DELIVERY, STORAGE and HANDLING**

- A. Package signs in labeled name groups.
- B. Store and protect products from soiling, damage, and degradation from exposure to excessive heat, moisture, and humidity.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install signs when ambient temperature is below 70 degrees F. Maintain minimum temperature during and after installation of signs.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturer must have not less than 5 years experience in the fabrication of types signs as specified herein. Manufacturers must comply with the specifications listed below.
- B. Substitutions:
  - 1. Will be considered by the Project Consultant and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

### **2.2 MATERIALS**

- A. All identifying device products are to contain recycled content.

### **2.3 SIGN STANDARDS**

- A. Provide signs that comply with the following:
  - 1. Tactile characters/symbols shall be raised the required 1/32 inch from sign face. Glue-on letters will not be accepted.
  - 2. All text shall be accompanied by Grade 2 Braille.

3. All letters, numbers and symbols shall contrast with their background, white characters on a dark, silver gray, background. Characters and background shall have a non-glare finish.
  4. Radius corners 3/8 inch.
- B. Plaque: Mfr: New Hermes Incorporated; Product: Exterior GravoTac, XT Polymer: #211
1. Thickness: 1/8 inch substrate.
  2. Color: Silver Grey 269-707 with #010 1/32 inch thick color white 200-505, with adhesive backing laminated to Silver Gray substrate.
  3. Material: Non-static, fire-retardant and self-extinguishing and impervious to most acids, alkalies, alcohol, solvents, abrasives and boiling water.
- C. Signs are to be rotary engraved. The sign fabricator is to follow all material specification of the material manufacturer.
- D. Letter font shall be Condensed Helvetica upper case.
- E. Size of letters and numbers shall be as follows:
1. Space Numbers: 3/4 inch minimum.
  2. Space Name: 5/8 inch minimum.
  3. Symbol Size: 3 inch minimum
  4. Building Name and Number: 1 inch minimum.
- F. Standard Grade 2 Braille shall be below copy.
- G. Signage Installation Heights: 60 inches from floor to centerline of sign. Locate on the wall adjacent to the latch side of the door.
- H. Mounting: Provide construction adhesive behind sign and 4 stainless steel tamper-proof screws per skin; provide butterfly anchors at gypsum drywall; provide lead shields in masonry.
- I. Caulk: Seal perimeter of sign to wall with Clear silicone sealant where sign is not completely flush with wall.

## **2.4 CAST ALUMINUM PLAQUE**

- A. Provide cast aluminum plaque as manufactured by Andco Industries Corporation, Art in Bronze, or equivalent as follows:
1. Material: High-grade aluminum ingots, alloy F-214.
  2. Border Style: No. 2 double lines.
  3. Letter Style: Helvetica satin finish.
  4. Background: Pebble charcoal finish.
  5. Mounting: Type concealed anchors.
  6. Size: In accordance with standard detail.
  7. Caulk: Seal perimeter of plaque to wall with thin neat bead of Clear silicone sealant.

## **2.5 BUILDING NAME LETTERS**

- A. Provide letters meeting the following requirements:
1. Type: Metropolitan 1000 Letter Style.
  2. Color: Dark Bronze "Durepox" (ten year warranty). Other finishes may be submitted for approval in accordance with Section 01630, Products and substitutions.

3. Size and Number:
  - (a) 18 inches high x 40 letters.
  - (b) 10-1/2 inches average width.
  - (c) 2-1/8 inches strike width.
  - (d) 3-3/4 inches depth.
4. Anchors: Stainless steel drilled in place concealed anchors minimum 2 anchors per letter.
5. Material: Welded aluminum back channel fabricated non-illuminated letters.
6. Manufacturer: Andco Industries Corporation or equivalent.
7. Caulk: Seal perimeter of each letter to wall with thin neat bead of Clear silicone sealant.

## **2.6 EXTERIOR HANDICAPPED SIGNS AT PARKING AREAS**

- A. Provide signage for each handicapped parking space per Florida Building Code and Florida Department of Transportation requirements.

## **2.7 EMERGENCY EXIT SIGNS**

- A. Provide signs in accordance with requirements of Article 2.2 above, with red background, Exterior Gravotac 1/8 inch core Red #248-707, and white raised lettering reading. At secondary means of egress/emergency egress openings: "EMERGENCY EGRESS – KEEP AREA CLEAR" and "EMERGENCY ESCAPE". At emergency rescue openings: "EMERGENCY RESUCE – KEEP AREA CLEAR". Braille lettering is not required. Sign dimensions: 1-1/2 inches high by width required for copy. Radius corners 3/8 inch locate next to all emergency egress windows, doors or other openings.
- B. Mounting shall be with Construction adhesive and 4 stainless steel non-removable head screws using butterfly anchors at drywall and lead using shields at masonry. Mount at locations as directed by Project Consultant in the field.
- C. Caulk: Seal perimeter of signs to wall with thin neat bead of clear silicone sealant where sign is not flush to wall.

## **2.8 CAPACITY SIGNS**

- A. Provide maximum capacity sign in a frame, provide one at main entrance door in each instructional space and each assembly space with a capacity of 50 or more persons.
- B. Provide signs minimum of 1-1/2 inches high by length required, reading "MAXIMUM CAPACITY". After or below "maximum capacity" provide number of occupants allowed.
- C. Fabricated signs in accordance with requirements specified in Article 2.2 above, with Silver Gray core and White lettering. Braille lettering is not required.
- D. Mounting shall be with construction adhesive and 4 stainless steel non-removable head screws using butterfly anchors at drywall and lead shields where mounted on masonry surfaces.

- E. Caulk: Seal perimeter of signs to wall with thin neat bead of clear silicone sealant where sign is not flush to wall.

## **2.9 EXIT ROUTE SIGNS**

- A. In rooms with 6 or more students: Provide exit route sign in a frame, provide one in every occupied space at main exit doors, consisting of 10 inch high by 12 inch wide, 3/4 inch by 3/4 inch black anodic architectural aluminum channel frame with metal clips reinforced mitered corners.
- B. Frames shall have 1/8-inch clear matte plexiglass face and 1/8-inch tempered hardboard back with 4 tamperproof screws fastened through hardboard back to wall. Install the card message between face and back.

## **2.10 TOILET ROOM HANDICAPPED SIGNS**

- A. Provide one sign depicting International Symbol of Accessibility (wheelchair) at each toilet room equipped with facilities for the handicapped. Include a male or female pictogram as well as Name. Room number and Braille lettering is required. Size shall be 8 inch x 8 inch.
- B. Color shall be white on a blue background.
- C. Fabricated signs in accordance with requirements specified in Article 2.2 above.
- D. Mounting signs in accordance with requirements specified in Article 2.2.

## **2.11 EXTERIOR AND INTERIOR SPACE NAME AND NUMBER SIGNS**

- A. Provide one sign at each door leading into each space.
  - 1. Size: 6-inch x 6-inch at all classrooms and laboratories. Exterior signs and signs at all other spaces to also be 6 inch x 6 inch.
- B. Fabricate signs in accordance with requirements specified in Article 2.2 above.
- C. Mounting: Signs shall be installed on the wall adjacent to the latch side of the door. If there is no space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall.
  - 1. Mounting location shall be such that a person may approach within three inches of signage without encountering protruding objects or standing within the swing of a door.
  - 2. Mount signs in accordance with requirements specified in Article 2.2 above.

## **2.12 BUILDING DIRECTIONAL SIGNS**

- A. Provide Directional Signs to Administrative Office. Copy to Read: "ALL VISITORS TO REPORT TO ADMINISTRATION". Provide arrow directional indicator to compliment copy. Provide 4 signs with arrow in each direction; 8 signs total.
- B. Size: Comply with requirements for Exterior Signs. Braille lettering is not required.



- C. Fabricated and install signs in accordance with requirements specified in Article 2.2 above.

## **2.13 SAFETY SIGNS**

- A. Provide at all mechanical and electrical rooms a sign to read as follows: "STORAGE NOT PERMITTED".
- B. Fabricated signs in accordance with requirements specified in Article 2.2 and 2.6 above, with red background and white raised letters, 1-1/2 inches high by width needed for copy. Radius corners 3/8 inch.
- C. Mount on wall beside doors in accordance with requirements specified in Article 2.2 above.
- D. Provide signs with copy as follows:
  1. "FIRE EXTINGUISHER INSIDE" at each main door of a room containing a fire extinguisher.
  2. "FIRE ALARM PULL STATION INSIDE" at each main door of a room containing a pull station.
  3. "ELEVATOR EMERGENCY" adjacent to exterior alarm bell.
  4. "STORAGE NOT PERMITTED" at mechanical, electrical, and kiln rooms.
  5. "IN CASE OF FIRE DO NOT USE ELEVATOR. USE STAIRWAYS" at elevator hall call stations. Refer to elevator specifications in Division-14
  6. "NO SMOKING" as indicated on Drawings.
- E. Signs not required when sufficient Pull Stations and Extinguishers are provided in the corridors.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that surfaces are ready to receive work.
- B. Verify location, placement and alignment of signage prior to installation.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's printed instructions.
- B. Install signs after receiving surfaces are finished in locations as indicated or directed.
- C. Install sign on receiving surface plumb and level.
- D. Clean and polish each sign following installation.

**END OF SECTION**

## SECTION 10520

### FIRE PROTECTION SPECIALTIES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Extent of fire extinguisher and cabinet work is indicated on the Drawings and include, but is not limited to, the following:
  - 1. Portable fire extinguisher and mounting assembly.
  - 2. Fire extinguisher cabinets.
  - 3. Valve cabinets.
  - 4. Hose cabinets.
  - 5. Attachment hardware.

##### 1.2 REFERENCES

- A. (National Association of Architectural Metal Manufacturers) NAAMM "Metal Finishes Manual".
- B. NFPA 10-Standard for Portable Fire Extinguishers.
- C. Section 15300-Fire Protection System.
- D. Underwriters Laboratory (UL).

##### 1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets and fire hose cabinets include rough-in dimensions and details showing mounting methods, relationship to surrounding construction, style and materials.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
  - 1. J.L. Industries.
  - 2. Larsen's Manufacturing Co.
  - 3. Potter-Roemer.
- B. Substitutions:
  - 1. Will be considered by the Project Consultant and Owner when submitted per requirements of Division-0, Division-1, and Section 01630-Product Substitution Procedures.

2. Equivalent products of other manufactures may be proposed, but in no case should extinguisher have a plastic valve and handle assembly.

## **2.2 FIRE EXTINGUISHERS**

- A. General: Provide fire extinguisher for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Project Consultant from manufacturer's standard.
- B. Abbreviations indicated below to identify extinguisher types related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher. Comply with NFPA-10.
  1. MP 10: Multi-Purpose Dry Chemical type for class A, B, and C fires (4A-80B:C). Steel shell with polyester/export paint finish UL-rated, 10 pound nominal capacity, 1 extinguisher per cabinet.
  2. WC-6L: Wet chemical for areas with cooking appliances that involve combustible cooking media (vegetable or animal oils and fats) including but not limited to kitchen grease fires, (2A:K) contains potassium acetate based, low PH agent. Steel shell with polyester/export paint finish UL-rated, 6 liter nominal capacity, 1 extinguisher per cabinet.

## **2.3 FIRE EXTINGUISHER CABINETS, VALVE CABINETS, and FIRE HOSE CABINETS**

- A. General: Provide fire extinguisher cabinets of suitable size for housing fire extinguishers of types and capacities required.
  1. Fire Extinguisher Cabinets: Larsen's Architectural Series Model #2409-R2 or 6R has been used as a basis of design.
  2. Valve Cabinets: Larsen's Architectural Series Model #VCS1818 recessed or semi-recessed has been used as a basis of design.
  3. Fire Hose Cabinets: Larsen's Model # HCS1823 recessed, semi-recessed, or surface mounted (refer to Section 15300-Fire Protection System).
  4. Provide Cabinets with fire rated option if applicable.
- B. Construction: Manufacturer's standard 20 gage steel box with white baked enamel finish; trim, frame, door and hardware to suit cabinet type. Weld all joints and grind smooth. Miter and weld perimeter doorframes.
- C. Cabinet Type: Suitable for mounting conditions indicated for recessed or semi-recessed type cabinet box (tub) in fire-rated and non fire-rated walls.
- D. Door Material and Construction: Manufacturer's standard door construction coordinated with cabinet type. Cold Rolled Steel: Manufacturer's standard flush, 1-piece steel door construction. Recessed: Flat trim door frame. Semi-recessed: rolled edge door frame.
  1. Extinguisher Cabinet: Larsen's "Vertical Duo" aluminum door.

2. Valve and Hose Cabinets: Full glass panel and flush aluminum steel door. Glass shall be tempered, 1/8 inch thick unless otherwise indicated.
  3. Door Hardware: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.
- E. Dimensions (must coordinate sizes to comply with be project specific requirements): Provide cabinets with inside dimensions as follows:
1. Fire Extinguisher Cabinets: 24 inch H x 9-1/2 inch W x 6 inch D.
  2. Valve Cabinets: 18 inch H x 18 inch W x 8 inch D.
  3. Hose Cabinets: 23 inch H x 18 inch W x 8 inch D.

## **2.4 FIRE EXTINGUISHER BRACKETS**

- A. Provide wall bracket Larsen's No. 846 as manufactured by fire extinguisher manufacturer, sized to accommodate fire extinguisher for this project. Provide 1 bracket per required fire extinguisher.

## **2.5 FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS**

- A. General: Comply with NAAMM "Metal Finishes Manual" for finishes designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering prior to shipment.
- B. Finishes:
1. Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale. Apply finish to all surfaces of fabricated and assembled units, whether exposed or concealed when installed, except those surfaces indicated to receive another finish.
  2. Baked Enamel Finish: Immediately after cleaning and pre-treatment, apply manufacturer's standard baked enamel coating.
  3. Finish Color: Color to be selected by Project Consultant from manufacturer's standard color pallet.

## **2.6 FIRE BLANKET CABINET**

- A. 62 inch x 80 inch fire retardant wool blanket with Larsen's wall mounted cabinet Model FB 1016 series (10 x 16 x 8) or FB 68-6 (68 x 6-1/4 x 4).
1. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.
  2. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install items included in this section in locations and at heights to comply with applicable regulations.
- B. Prepare recesses in wall for fire extinguisher cabinets as required by type and size of cabinet and style of trim, and to comply with manufacturer's instructions.
- C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
- D. All extinguishing equipment shall have annual maintenance performed and be certified according to requirements of NFPA 10 no more than 1 month prior to occupancy.

### **3.2 IDENTIFICATION**

- A. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" painted on door by silk-screen process. Identify fire valve in cabinet with lettering spelling "FIRE DEPT. VALVE" painted on door by silk-screen process.
  - 1. Provide lettering on doors as indicated, or if not indicated, as selected by Project Consultant from manufacturer's standard letter sizes, styles, colors, and layouts.
- B. Identify bracket-mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style, and location to be selected by Project Consultant.
- C. Identify all fire extinguishers with permanent marking (non-removable label, engraving, silk screen process) as follows:
  - 1. PROPERTY OF THE CITY OF TAMPA UNLAWFUL FOR PERSONAL USE.

**END OF SECTION**

## SECTION 10810

### TOILET ACCESSORIES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Extent of each type of toilet accessory is indicated on drawings or is specified herein.
- B. Types of toilet accessories required include, but are not limited to, the following:
  - 1. Grab Bars.
  - 2. Hand Dryer.
  - 3. Mirror Units.
  - 4. Mop and Broom Holders.
  - 5. Paper Towel Dispensers.
  - 6. Sanitary Napkin Disposal Units.
  - 7. Toilet Tissue Dispensers.
  - 8. Utility Shelf Units.
  - 9. Waste Receptacle.
- C. Work Not Included: Soap dispensers will be furnished and installed by the Owner. However, wall blocking shall be required and provided under work of this contract.

##### 1.2 RELATED SECTIONS

- A. Section 01572-Construction Waste Management.
- B. Section 06100-Carpentry
- C. Section 07920-Joint Sealants.

##### 1.3 DESIGN REQUIREMENTS

- A. Provide surface-mounted toilet accessories unless indicated otherwise. Attach to walls with heavy-duty stainless steel tamper-proof fasteners.
- B. Provide stainless steel finish for all toilet accessories unless otherwise noted.

##### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.
  - 1. Recycled Content:
    - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

- (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
  - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
  - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Schedule: Provide a toilet accessory schedule keyed in to the contract set room numbers indicating required number and type of accessory for each space.
- C. Samples: If requested by Project Consultant, submit full-size samples of specific units to Project Consultant for review of design and operation. Acceptable samples will be returned and may be used in work.
- D. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices and cutout requirements in other work.

## **1.5 QUALITY ASSURANCE**

- A. Inserts and Anchorages: Furnish inserts and anchoring devices, which must be set in concrete or built into masonry. Coordinate delivery with other work to avoid delay. Provide wood blocking and bracing requirements for units installed in gypsum board partition systems.
- B. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise specified.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering toilet accessories which may be incorporated in the work include the following:
  - 1. American Specialties, Inc. (ASI).
  - 2. (Basis of Design) Bobrick Washroom Equipment, Inc.
  - 3. Bradley Corporation.
  - 4. Georgia Pacific, for toilet tissue.

### **2.2 MATERIALS**

- A. All toilet accessory products are to contain recycled content.

### **2.3 ACCESSORY ITEMS**

- A. General: Contractor shall provide these accessories. The following list of manufacturers and model numbers identify the unit quality. Equivalent models from the above list of manufacturers will be considered by the Owner.
- B. Grab Bars:
1. Wall-mounted type.
  2. Theft-proof concealed fasteners.
  3. Heavy duty with peened non-slip gripping surface.
  4. 1-1/4 inches diameter.
  5. Stainless steel finish.
  6. Bobrick Model No. B-5806 Series.
- C. Hand Dryer:
1. Operation: Automatic hands-free.
  2. Mounting: Recessed wall mounted hand dryer with max 4 inch protrusion from wall. Must be ADA compliant.
  3. Cover:
    - (a) Cast-iron cover.
    - (b) Finish: High-gloss vitreous enamel cover or porcelain enamel.
    - (c) Color: White.
  4. Nozzle: Two-position, chrome plated, vandal resistant.
  5. One-piece cast aluminum base with vandal-resistant air-inlet vanes on sides and bottom.
  6. Motor shall be 1/10 HP, 115 v AC, 20 AMP, 2300 watts, 50/60 HZ, single phase.
  7. Dryer will shut-off when hands are removed.
  8. Unit shall be UL listed.
  9. Warranty: 10 years against manufacturing defects, brushes 3 years.
  10. (Basis of Design) Mfr: Bobrick; Product: Model No. B-750.
    - (a) Other Acceptable Manufacturers:
      - (1) Mfr: American Specialties, Inc. (ASI); Product: Model 0195.
      - (2) Mfr: Bradley Corporation; Product: Model 2897-28.
      - (3) Mfr: World Dryer, Corporation; Product: Model-A, Model XRA5Q.
- D. Mirror Units (Handicap Accessible Toilets & Staff Areas Only):
1. Size: 18 inch x 30 inch.
  2. Surface-mounted.
  3. One-piece roll formed frame units 3/4 inch x 3/4 inch, type 304 stainless steel angle with satin finish.
  4. 1/4 inch tempered glass mirror.
  5. Bobrick Model No. B-2908.
- E. Mirror Units (Handicap Accessible Toilets & Student/Public Areas):
1. Size: 18 inch x 30 inch.
  2. Surface-mounted.
  3. Frameless stainless steel mirror with bright polish finish.
  4. Bobrick Model No. B-1556.
- F. Mop and Broom Holders:



1. Provide one each at every custodial closet, over the mop sink.
  2. Size: 36 inch long with 4 mop holders and 3 hooks.
  3. Wall-surface mounted.
  4. Stainless steel finish.
  5. Bobrick Model No. B-224.
- G. Paper Towel Dispenser:
1. Provide one in each single person toilet room.
  2. Surface-mounted.
  3. Dispense 400 C-fold paper towels.
  4. Bobrick Model No. B-262
- H. Sanitary Napkin Disposal:
1. Satin Stainless steel finish.
  2. Removable 1.2-gallon plastic receptacle and self-closing panel covers opening.
    - (a) Mounted in partition: Bobrick B-354.
    - (b) Recess Mounted: Bobrick B-353.
    - (c) Surface Mounted: Bobrick B-254.
- I. Toilet Tissue Dispenser (for typical stalls):
1. Jumbo Senior roll tissue dispenser.
  2. 12 inch diameter roll.
  3. Stainless Steel Satin Finish.
  4. Georgia Pacific model 59493. Prior to bid or purchase, verify this model is compatible with paper products currently being used by the Owner.
- J. Toilet Tissue Dispenser (for ADA stalls & individual toilet rooms):
1. Jumbo Junior roll tissue dispenser.
  2. 11 inch diameter roll.
  3. Stainless Steel Satin Finish.
  4. Georgia Pacific model 58493. Prior to bid or purchase, verify this model is compatible with paper products currently being used by the Owner.
- K. Utility Shelf Units:
1. Size; 8 inch wide, 24 inches long.
  2. 18 gage, Type 304 stainless steel with satin finish, with hemmed front edge for safety.
  3. Bobrick Model No. B-298.
- L. Waste Receptacle (For Group Toilet Rooms Only):
1. Satin finish stainless steel seamless beveled flange.
  2. Removable 12-gallon receptacle locks into cabinet.
  3. Bobrick model B-3644.
  4. With reusable heavy duty vinyl liners. Bobrick # 3944-12.

## 2.4 FASTENERS

- A. Fabricate concealed mounting devices and fasteners from stainless steel and within code compliant accessible heights.
- B. Finish exposed mounting devices and fasteners to match particular accessory.
- C. Fasteners: Stainless steel theft-resistant type. Use hex-bolts in lieu of anchored screw wherever feasible.

## **PART 3 PRODUCTS**

### **3.1 INSTALLATION**

- A. Install toilet accessories in accordance with manufacturer's printed directions and within code compliant accessible heights.
- B. Finish paint or tile behind all toilet accessories.
- C. Secure toilet accessories to support substrate with stainless steel fasteners and anchors of types necessary for rigid anchorage to substrate construction. Provide back-up plates as required.
- D. Install plumb and level, securely and rigidly anchored to substrate.
- E. Conceal evidence of drilling and fitting in adjacent surface.
- F. Provide a neat, clean sealant bead around all toilet accessories at wall surface.
- G. Special Tools: Deliver properly identified special tool of each type for theft-proof fasteners to Owner.
- H. Keys: Deliver three keys for each keyed alike accessory group to Owner at completion.

### **3.2 CLEANING**

- A. After installation, clean toilet accessories in a manner not to damage finish and leave in condition satisfactory to Project Consultant.

**END OF SECTION**

## SECTION 11450

### RESIDENTIAL APPLIANCES

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Residential appliances.
- B. Types of residential appliances required include the following:
  - 1. Refrigerators.
  - 2. Range.
  - 3. Washer.
  - 4. Dryer.
  - 5. Garbage Disposal.
  - 6. Range Hood.

##### **1.2 RELATED WORK**

- 1. Section 06400-Architectural Woodwork.
- 2. Division 15-Plumbing.
- 3. Division 16-Electrical.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of residential appliances including data indicating compliance with requirements. Submit operating and maintenance instructions for each item of residential appliance.
  - 1. Energy Efficiency:
    - (a) Submit documentation for ENERGY STAR qualifications for all residential appliances provided under this Section.

##### **1.4 QUALITY ASSURANCE**

- A. Certification Labels: Provide residential appliances that comply with standards and bear certification labels as follows:
  - 1. Energy Ratings: Provide energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade Commission.
    - (a) Provide ENERGY STAR Rated appliance where available.
  - 2. UL Standards: Provide residential appliances with UL labels.
- B. Provide residential appliances by a single manufacturer to the greatest extent possible for the entire project.

##### **1.5 DELIVERY, STORAGE and HANDLING**

- A. Deliver products to project site in manufacturer's undamaged protective containers, after spaces to receive them have been fully enclosed.

##### **1.6 WARRANTY**

- A. Submit manufacturer's standard written warranty for each item of residential appliance.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers: Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
1. Frigidaire.
  2. General Electric Company (GE).
  3. Kenmore.
  4. Whirlpool Corporation.

### **2.2 EQUIPMENTS**

- A. Refrigerator-Side by Side:
1. 22.0 cubic feet capacity.
  2. Provide with icemaker.
  3. 3 adjustable glass cabinet shelves.
  4. 4 door shelves.
  5. Textured steel doors and case.
  6. Color: White.
- B. Refrigerator-Top Freezer:
1. 21.0 cubic feet capacity.
  2. Provide with icemaker.
  3. 4 cabinet shelves.
  4. 3 door shelves.
  5. Texture steel doors and case.
  6. Color: White.
- C. Range-Free Standing Electric 30 Inch:
1. Self-cleaning oven.
  2. White porcelain enamel cook top.
  3. Glass oven door with window.
  4. 2 oven shelves.
  5. Broiler pan with grid.
  6. Lift-off oven door.
  7. Electronic oven timer.
  8. Infinite heat controls.
  9. Oven light.
  10. Two 6 inch and two 8 inch heating elements.
  11. Color: White.
- D. Washer-Electric:
1. Front Load.
  2. 5 water temperature system.
  3. 5 foot cord.
  4. Super large capacity/4.0 cubic feet.
  5. 26 cycles
  6. Auto water levels.
  7. Bleach dispenser.
  8. Fabric softener dispenser.
  9. Color: White.
- E. Dryer-Electric:
1. Capacity: King-size 6.0 cubic feet.
  2. Front Load.

3. Automatic dry control.
  4. 4 heat selections.
  5. Upfront lint filter.
  6. End-of-Cycle signal.
  7. 6 dry cycles.
  8. Color: White.
- F. Garbage Disposal:
1. 3/4 HP.
  2. Continuous feed.
  3. Wall switch control.
  4. Grinding speed: 2700 rpm.
  5. Removable splashguard.
  6. Sound insulation.
- G. Range Hood-30 Inch:
1. Ventilating Type for mounting below wall cabinets.
  2. 2 speed fan.
  3. Washable filter.
  4. 160 CFM complete with duct, wall or roof cap and shutter.
  5. Built in cook top light.
  6. Color: White/White.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. General: Comply with manufacturer's instructions and recommendations.
- B. Built-in Equipment: Securely anchor units to supporting cabinetry or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- D. Utilities: Refer to Division 15 and 16 for plumbing and electrical requirements.

### **3.2 ADJUST AND CLEAN**

- A. Testing: Test each item of residential equipment to verify proper operation. Make necessary adjustments.
- B. Accessories: Verify that accessory items required have been furnished.
- C. Cleaning: Remove packing material from residential equipment items and leave units in clean condition, ready for operation.

**END OF SECTION**

## SECTION 15070

### MECHANICAL SOUND and VIBRATION CONTROL

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Vibration Isolation.

##### **1.2 RELATED SECTIONS**

- A. Section 15060 - Hangers and Support.
- B. Section 15625 - Air Cooled Chiller.
- C. Section 15645 - Mechanical Draft Cooling Tower.
- D. Section 15720 - Air Handling Unit.
- E. Section 15845 - Air Terminal Unit.

##### **1.3 REFERENCES**

- A. ASHRAE HVAC Applications Handbook, Latest Edition - Chapter 43.

##### **1.4 QUALITY ASSURANCE**

- A. Maintain ASHRAE criteria for average noise levels of all equipment at full load condition. Contractor shall be responsible for selecting and installing vibration isolators as specified or indicated to prevent transmission of vibration which would cause noise levels in excess of those recommended.

##### **1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.
- B. Submit manufacturer's installation instructions under provisions of Section 01330 - Submittal Procedures.

#### **PART 2 PRODUCTS**

##### **2.1 ACCEPTABLE MANUFACTURERS - VIBRATION ISOLATORS**

- A. Mason Industries, Inc. (Hollis, NY)
- B. Vibration Eliminator Co. (Long Island City, NY)
- C. Vibration Mountings & Controls, Inc. (Butler, NJ)

##### **2.2 ACCEPTABLE MANUFACTURERS - DUCT SILENCERS**

- A. Titus

- B. IAC
- C. United McGill
- D. Dynasonic

**2.3 VIBRATION ISOLATORS**

- A. Design all vibration isolation systems to achieve an 80 percent to 95 percent isolation at the lowest rotational speed of the equipment regardless of the condition of the mounting floor.
- B. Properly adjust the flexible isolators and install under provisions of the weight distribution of the equipment to provide a stable mounting decoupled system. Design each flexible isolator and install so that the equipment support base remains level during deflection. The natural frequency for each support point, based upon the load per isolator and its stiffness, shall not differ by more than plus or minus 10 percent.
- C. The isolation system shall not cause the equipment to generate any mechanical problem, mechanical failure or misalignment of the couplings and bearings.
- D. Furnish information as may be required to verify that all vibration control equipment will meet static deflections and percentage isolation reduction specified for various uses.
- E. Acoustical Performance Specifications: Noise levels due to air conditioning unit fan, ventilating equipment, ducts, grilles, registers, diffusers and air system pressure reducing devices to conform to the RC Noise Rating Procedure outlined in Chapter 43 of the latest edition of the ASHRAE HVAC Applications Handbook and ANSI Standard S12.60-2002. **Design spaces for the maximum noise criteria range listed below.**

Classrooms & Other Core Learning Spaces	RC-25(N) to RC-30(N)
Chiller Rooms	RC-60(N)
Storage, Toilets, Custodial Rooms	RC-45(N)
Mechanical Rooms	RC-45(N)
Kitchens	RC-40(N)

- F. Internally lined double wall insulated ducts shall be provided on all supply and return air ducts for a distance of 20 feet to and from the air handler unit discharge.
- G. Exterior installed air cooled chillers, emergency generators, pump and accessories shall be designed so that the noise levels do not exceed the lowest of Local Noise Ordinances, or 55 dBA at the property line.

**2.4 FABRICATION**

- A. Provide pairs of neoprene side snubbers or restraining springs where side torque or thrust may develop.
- B. Color code spring mounts.

- C. Select springs to operate at 2/3 maximum compression strain with 1/4 inch ribbed neoprene pads.
- D. Model CSIW, Size CC-625 manufactured by Mason Industries.

## **2.5 FLOOR MOUNTED HVAC EQUIPMENT**

- A. Mount equipment directly on stable bare steel spring isolators except when the units are furnished with internal structural frames and external lugs of suitable strength and rigidity or without any severe overhangs, then no additional structural frame need be furnished and installed beneath the unit. Mount the motor integrally to the unit and mount on slide rails.
- B. Provide internally lined perforated duct on the supply and return air duct of the air handler unit when the noise levels exceed those listed above in order to attenuate the sound levels emanating from the unit.

## **2.6 SUPPORT OF WATER PIPING**

- A. All water piping in mechanical equipment rooms shall be resiliently supported.
- B. The steel spring element of hangers or floor mounting assembly provides 1 inch static deflection.

## **2.7 MOTOR ACOUSTICAL PERFORMANCE**

- A. Motor drives for pumps, when installed per plans and specifications are to operate with noise levels not exceeding 90 dBA. The final equipment location and design selection shall comply with the maximum noise criteria levels specified in paragraph 2.3(E).
- B. Noise Levels: Determined under provisions of IEEE 85 - Procedure for Air-Borne Noise Measurements on Rotating Electric Equipment.

# **PART 3 EXECUTION**

## **3.1 INSTALLATION**

- A. Install vibration isolators on all equipment mounted on or suspended from approved foundations and supports.
- B. Install air handler units on 6 inch concrete housekeeping pads unless AHU's are provided with a minimum 6 inch factory installed rails. In such designs, the use of the 6 inch concrete pads shall not be required.
- C. Install air handler units on 3/8 inch cross-ribbed, oil-resistant, resilient neoprene mounting pad when the units are provided with factory installed internal spring isolation on the fan assembly.
- D. Install air handler units on floor mounted spring-type vibration isolators when the units are not factory installed with internal spring isolation on the fan assembly.

**END OF SECTION**



**SECTION 15083**  
**DUCT INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Ductwork insulation.

**1.2 RELATED SECTIONS**

- A. Section 15075 - Mechanical Identification.
- B. Section 15810 - Ducts.

**1.3 REFERENCES**

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

**1.4 QUALITY ASSURANCE**

- A. Applicator: Company specializing in ductwork insulation application with three years minimum experience.
- B. Materials: UL listed; flame spread/smoke developed rating of 25/50 under provisions of ASTM E84.

**1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.
- B. Include product description, list of materials and thickness for each service.
- C. Submit manufacturer's installation instructions under provisions of Section 01330 - Submittal Procedures.

**PART 2 PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS - DUCTWORK INSULATION**

- A. Owens-Corning
- B. Certainteed
- C. Manville
- D. Knauf

**2.2 ACCEPTABLE MANUFACTURERS - FLEXIBLE INSULATION**

- A. Omniair

- B. Thermaflex
- C. Atco

### 2.3 INSULATION

- A. Type A: For interior installed concealed air conditioning supply and return air ducts. No facing will be required for venting ducts. Insulation shall not be required on exhaust or outside air makeup ducts.
  - 1. Flexible (Blanket) Glass Fiber Insulation
    - (a) ANSI/ASTM C553.
    - (b) Commercial grade.
    - (c) 2 inch thick, Density 1 PCF.
    - (d) 'K' value of 0.28 at 75 Degree F.
    - (e) 0.002 inch foil scrim/kraft paper facing with 2 inch wide stapling flange.
- B. Type B: For interior installed exposed single wall air conditioning supply and return air ducts in mechanical rooms only when double wall insulated duct is not provided. Insulation shall not be required on exhaust or outside air makeup ducts.
  - 1. Rigid Glass Fiber
    - (a) ANSI/ASTM C612.
    - (b) Commercial grade.
    - (c) Class 1.
    - (d) 1-1/2 inch thick, Density 3 PCF.
    - (e) 'K' value of 0.22 at 75 Degree F.
    - (f) 0.002 inch foil scrim/kraft paper facing with 2 inch wide stapling flange.
- C. Type C: For exterior installed single wall air conditioning supply and return air ducts only. All metal surfaces to receive a watertight exterior duct sealant.
  - 1. Rigid Glass Fiber
    - (a) ANSI/ASTM C612.
    - (b) Commercial grade.
    - (c) Class 1.
    - (d) 2 inch thick, Density 3 PCF.
    - (e) 'K' value of 0.22 at 75 Degree F.
- D. Type D: For connection between interior installed air conditioning supply/return air ducts and the terminal outlets/inlets.
  - 1. Insulated flexible glass fiber duct:
    - (a) UL 181, Class 1
    - (b) Commercial grade.
    - (c) 'R' value of 6.0 at 75 Degree F.
    - (d) Aluminum foil/polyester laminate inner core liner encapsulating a steel wire helix, covered with factory installed high density glass fiber blanket insulation and metallized spiral reinforced vapor barrier jacket.
    - (e) Series 1200 as manufactured by Omniair or Series MKE as manufactured by Thermaflex.
- E. Internal Duct Liner:
  - 1. UL 181
  - 2. Commercial grade.
  - 3. 'K' value of 0.27 at 75 Degree F.

4. Double wall insulated duct containing an outer solid steel pressure shell, perforated steel inner liner, 1 inch fiberglass insulation encapsulated with 0.002 inch thick mylar sleeve to seal the porous insulation, insulation sandwiched between the inner liner and outer shell.
5. Acousti-k27 as manufactured by United McGill.  
Note: Exposed duct liner in contact with air stream is **PROHIBITED**.

F. Accessories:

1. Insulation Bands: 9/16 inch wide x 0.015 inch thick galvanized steel band with positive cinch worm gear and screwdriver slot hex head.
2. Adhesives: Water base, fire resistive, non-toxic and compatible with mating materials. Petroleum-based products are **PROHIBITED**.
3. Pressure Sensitive Tape: Foil faced (silver) scrim duct tape with rubber adhesive, 25/50 rating for sealing of rigid ductboard and duct wrap seam joints, 0.02 Perm.
4. Impale Anchor Pins: 12 gauge galvanized steel, adhered with mastic. The use of self adhesive anchor pins is **PROHIBITED**.
5. Joint Tape: Glass fiber cloth, open mesh.
6. Mechanical Fasteners: Spot welded.
7. Aluminum Jacket: ASTM B209, 20 mil thick Type 1100 aluminum jacket with stucco embossed pattern finish and 1/2 inch wide x 0.020 inch thick Type 3003 aluminum bands on maximum 24 inch centers.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Do not apply insulation until after all pressure testing is complete, all surfaces to be covered are clean and dry and all foreign materials such as oil, grease, rust, scale and dirt have been removed.
- B. Apply clean and dry insulation only.

### **3.2 INSTALLATION**

- A. For single wall galvanized steel ductwork, install insulation under provisions of the manufacturer's instructions.
- B. For double wall insulated galvanized steel ductwork, external insulation is not required on duct installed within the building envelope. External insulation is required on single wall duct installed outside the building envelope.
- C. Provide double wall insulated galvanized steel duct for use as sound attenuation for the first 20 feet of both the supply and return air ductwork of the HVAC equipment.
- D. Fully insulate the top surfaces of diffusers and grilles with 2 inch thick, 1 PCF density flexible glass fiber insulation and seal with vapor barrier silver foil tape and mastic. In addition, adhere the insulation edges to the ceiling grid with vapor barrier silver foil tape.
- E. All exterior installed ductwork shall be weatherproof including the connections to the HVAC equipment and building penetrations.
- F. Support all exterior installed ductwork with angle iron bracing secured to structure and/or concrete pad. All ductwork and ductwork support penetrations shall also be

provided to maintain watertight integrity of the building envelope and roofing system (if applicable). Flash and counterflash all ductwork where it penetrates the building envelope.

- G. The exterior installed ductwork shall be sealed prior to being insulated with 2 inch thick rigid fiberglass duct board. The duct metal surfaces shall receive an exterior duct sealant to form a positive air and watertight encapsulation so that it bonds to the metal but remains flexible to allow metal expansion/contraction in the temperature range of -30 to 175 Degree F. The sealant shall be ultraviolet and ozone resistant if exposed to direct sunlight or be capable of being painted with a compatible paint that provides such resistance after the sealant has cured. The definition of sealant is not limited to adhesives or mastics, but includes tapes and combinations of open weave fabric strips.
- H. Provide adhesive coverage on all ducts in accordance with the manufacturer's installation requirements.
- I. Provide insulation with vapor barrier whenever conveyed air is below ambient temperature.
- J. Install insulation continuous through sleeves and openings and unbroken over seams, angles, hangers and other accessories.
- K. Do not use scrap pieces to make a full length section of insulation. Eliminate voids by refitting or replacing insulation.
- L. Tightly secure insulation to the ducts and heating coil enclosures with approved galvanize steel impaling anchor pins adhered to the duct surface with mastic. Self adhesive type anchor pins are **PROHIBITED**.
- M. Butt joints tightly without voids. Where insulation board is faced with a vapor barrier, apply foil faced (silver) duct tape to seal vapor barrier.
- N. Cut flexible duct as short as possible, but not less than 2 feet or greater than 8 feet in length. Do not install flexible duct so that it lies on the ceiling.

### 3.3 SCHEDULE

A.	<u>Insulation</u>	<u>Type</u>	<u>Thickness (Inches)</u>	<u>Density (PCF)</u>
	Outside Air Intake Ducts	Uninsulated	N/A	N/A
	Exhaust Ducts	Uninsulated	N/A	N/A
	Supply Air Ducts Within Bldg. Envelope)	A	2	1 (Concealed
	Supply & Return Air Duct Room)	B	1-1/2	3 (Mechanical
	Return Air Duct Within Bldg. Envelope)	A	2	1 (Concealed
	Return Air Duct Within Bldg. Envelope)	B	1-1/2	3 (Exposed
	Supply & Return Air Duct (Concealed Outside Bldg. Envelope)	A	2	1
	Supply & Return Air Duct Outside Bldg. Envelope)	C	2	3 (Exposed

### END OF SECTION

**SECTION 15089**  
**PIPING INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and accessories.

**1.2 RELATED SECTIONS**

- A. Section 15075 - Mechanical Identification.
- B. Section 15078 - Field Painting of Mechanical Systems.
- C. Section 15105 - Plumbing Piping.
- D. Section 15183 - Hydronic Piping.

**1.3 REFERENCES**

- A. ANSI/ASTM C578 - Preformed, Block Type Cellular Polystyrene Thermal Insulation.
- B. ASTM E84 - Surface Burning Characteristics of Building Materials.
- C. ASTM C534 - Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- D. ANSI/ASTM C552 - Cellular Glass Block and Pipe Thermal Insulation.

**1.4 QUALITY ASSURANCE**

- A. Applicator: Company specializing in piping insulation application with three years minimum experience.
- B. Materials: Flame spread/smoke developed rating of 25/50 under provisions of ASTM E84.

**1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.
- B. Include product description, list of materials and thickness for each service and locations.
- C. Submit manufacturer's installation instructions under provisions of Section 01330 - Submittal Procedures.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS - INSULATION**

- A. Owens-Corning.
- B. Pittsburgh Corning.
- C. IMCOA.
- D. Armacell.
- E. Knauf.
- F. Cell-U-Foam.

### **2.2 ACCEPTABLE MANUFACTURERS- PRE-INSULATED CHW PIPING**

- A. Thermacor.
- B. Perma-Pipe.
- C. Rovanco.

### **2.3 ACCEPTABLE MANUFACTURERS - VAPOR BARRIER JACKETS**

- A. VentureClad (Venture Tape Corporation).

### **2.4 INSULATION**

- A. **Type A:** For interior above ground domestic hot water supply and recirculating piping.
  - 1. Pipe:
    - (a) ANSI/ASTM C534 or C547.
    - (b) Two-piece, rigid preformed, heavy density fiberglass pipe insulation and factory applied reinforced foil vapor barrier, all service jacket with self-sealing longitudinal lap and butt adhesive joints, -60 to 450 Degree F, non-combustible.
    - (c) Maximum Water Vapor Transmission Rating: 0.20 perm.
    - (d) 'K' value of 0.24 at 75 Degree F.
    - (e) Equivalent to Owens-Corning 25ASJ/SSL
  - 2. Pipe:
    - (a) ASTM C534, Type I.
    - (b) One-piece, flexible preformed elastomeric closed cell tubular pipe insulation, -297 to 220 Degree F.
    - (c) Maximum Water Vapor Transmission Rating: 0.01 perm-inch.
    - (d) Maximum Thermal Conductivity: 0.25 BTU-In/Hr. Sq. Ft. °F at 75 °F mean temperature.
    - (e) Equivalent to Armacell Armaflex AP.
  - 3. Fittings:
    - (a) One-piece, preformed fitting insulation.
    - (b) Same thickness as adjacent pipe covering.

- B. **Type B:** For condensate drain, refrigeration suction lines and refrigeration hot gas lines. Protect with two coats of UV inhibited vinyl latex finish if installed outdoors exposed to weather.
1. Pipe:
    - (a) ANSI/ASTM C534 or C578.
    - (b) One piece, preformed closed cell tubular pipe insulation.
    - (c) Maximum Water Vapor Transmission Rating: 0.10 perm.
    - (d) 'K' value of 0.23 at 75 Degree F.
    - (e) Equivalent to Styrofoam.
  2. Pipe
    - (a) ASTM C534, Type I.
    - (b) One-piece, flexible preformed elastomeric closed cell tubular pipe insulation, -297 to 220 Degree F. Protect with two coats of UV inhibited vinyl latex finish if installed outdoors and exposed to weather.
    - (c) Maximum Water Vapor Transmission Rating: 0.01 perm-inch.
    - (d) Maximum Thermal Conductivity: 0.25 BTU-In/Hr. Sq. Ft. °F at 75 °F mean temperature.
    - (e) Equivalent to Armacell Armaflex AP.
- C. **Type C:** For interior above ground chilled water piping.
1. Pipe:
    - (a) ASTM C534 or C552.
    - (b) Two-piece, rigid preformed closed cell foamglass pipe insulation with fire resistant jacket.
    - (c) Maximum Water Vapor Transmission Rating: 0.10 perm.
    - (d) 'K' value of 0.33 at 75 Degree F.
    - (e) Equivalent to Pittsburgh Corning Foamglas.
  2. Pipe:
    - (a) ASTM C534, Type I.
    - (b) One-piece, flexible preformed elastomeric closed cell tubular pipe insulation, -297 to 220 Degree F.
    - (c) Maximum Water Vapor Transmission Rating: 0.01 perm-inch.
    - (d) Maximum Thermal Conductivity: 0.25 BTU-In/Hr Sq. Ft. °F at 75 °F mean temperature.
    - (e) Equivalent to Armacell Armaflex AP.
  3. Fittings:
    - (a) Fittings finished with mastic and reinforced with glass fabric.
- D. **Type D:** For underground chilled water piping.
1. Field Insulated Pipe:
    - (a) ASTM C552
    - (b) Two-piece, rigid preformed cellular glass pipe insulation with self-sealing 45 mil non-metallic waterproof membrane.
    - (c) Maximum Water Vapor Transmission Rating: 0.10 perm.
    - (d) 'K' value of 0.33 at 75 Degree F.
    - (e) Equivalent to Pittsburgh Corning Foamglas with Pittwrap CW jacket or VentureClad jacket.
  2. Pre-Insulated Pipe:
    - (a) ASTM A-53 Grade B, electric resistance welded or seamless for sizes 5 inch and larger or ASTM A-120/A-53, Grade A, continuous welded for 4 inch and smaller, Schedule 40, black steel.

- (b) 90-95 percent closed cell polyurethane foam insulation of 2.5 to 3.5 PCF density.
- (c) "K" value of 0.14 at 75 Degree F.
- (d) Fittings: Factory prefabricated and pre-insulated with pre-cut sectional urethane foam to the thickness specified, covered with PVC jacket with joints sealed with polyethylene backed, pressure sensitive 30 mil thick butyl rubber tape.
- (e) Jacket: ASTM D-1784, PVC, wall thickness ten times nominal jacket diameter, but not less than 60 mils.
- (f) Pipe ends insulated with pre-cut sectional urethane foam to the thickness specified, covered with PVC jacket with joints sealed with polyethylene backed, pressure sensitive 30 mil thick butyl rubber tape.
- (g) Equivalent to Thermacor "Ferro-Therm".

**E. Type E:** For exterior above ground chilled water piping.

- 1. Pipe:
  - (a) ASTM C534.
  - (b) Two-piece, rigid preformed closed cell foam glass pipe insulation with 0.016 inch aluminum jacket, fittings finished with mastic and reinforced with glass fiber.
  - (c) Maximum Water Vapor Transmission Rating: 0.02 perm-inch.
  - (d) Maximum Thermal Conductivity: 0.25 BTU-In/Hr Sq. Ft. °F at 75°F mean temperature.
  - (e) Equivalent to Pittsburgh Corning Foamglass.
- 2. Pipe:
  - (a) ASTM C534 or C552.
  - (b) One-piece preformed elastomeric closed cell tubular pipe insulation, -297 to 220 Degree F. Protect with two coats of UV inhibited vinyl latex finish.
  - (c) Maximum Water Vapor Transmission Rating: 0.01 perm-inch.
  - (d) Maximum Thermal Conductivity: 0.25 BTU-In/Hr Sq. Ft. °F at 75 °F mean temperature.
  - (e) Equivalent to Armacell Armaflex AP.

## 2.5 JACKETS

- A. Interior Above Grade Application:
  - 1. Vapor Retardant Jacket: Kraft reinforced foil with self-sealing adhesive.
  - 2. Vapor Barrier High Performance Jacket: Five ply self-adhesive laminate that exhibits a perm rating of 0.0000 when tested in accordance with ASTM E-96 as manufactured by VentureClad or approved equal.
- B. Exterior Above Grade Application:
  - 1. Aluminum Jacket: 0.016 inch thick, smooth finish, snap lock longitudinal seam and aluminum banding.
  - 2. Vapor Barrier & Weatherproof High Performance Jacket: UV resistant, five ply self-adhesive laminate that exhibits a perm rating 0.0000 when tested in accordance with ASTM E-96, installed without any additional mechanical attachments and having a ten year warranty as manufactured by VentureClad or approved equal.



## 2.6 ACCESSORIES

- A. Insulation Bands: 3/4 inch wide x 0.007 inch thick galvanized steel band with positive cinch worm gear and screwdriver slot hex head.
- B. Adhesives: Water base, fire resistive, non-toxic and compatible with insulation. Petroleum-base products are **PROHIBITED**.
- C. Fibrous Glass Cloth: Untreated 10 x 10 mesh; 9 Oz/Sq. Yd. weight.
- D. Insulating Cement: ANSI/ASTM C195; hydraulic setting mineral wool.
- E. Finishing Cement: ASTM C449.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Do not apply insulation until after all pressure testing is complete, all surfaces to be covered are clean and dry and all foreign materials such as oil, grease, rust, scale and dirt have been removed.
- B. Apply clean and dry insulation only.

### 3.2 INSTALLATION

- A. Install insulation under provisions of the manufacturer's instructions.
- B. Install insulation on all supply piping and condensate piping in concealed areas as well as exposed areas including condensate piping located between the first floor ceiling and the second floor slab to prevent condensation from forming on the pipe and falling onto the ceiling tiles.
- C. Insulate all cold surfaces including metal hangers, anchors, supports, control sensors, wells and similar items subject to condensation with materials of the same composition to which they are attached and of sufficient length and thickness to prevent condensation. Provide a complete moisture and vapor seal wherever the insulation terminates against metal hangers, anchors and other projections on cold surfaces.
- D. Provide continuous insulation through sleeves and openings except at pipe sleeves piercing exterior walls, floors or ceilings below ground level. Pack annular spaces with fireproof, self-supporting insulation material.
- E. On insulated piping with a factory applied vapor retardant, install same thickness insulation as the adjoining pipe insulation on valves and other fittings, unions, flanges, strainers, flexible connections and expansion joints and locate so as to obtain the maximum strength and securement. Terminate insulation neatly with plastic material trowelled on bevel. Seal joints, protruding metal parts and valve stems thoroughly as recommended by the manufacturer. Field applied vapor barrier clad material is also approved.

- F. On insulated piping without a vapor retardant or vapor barrier and conveying fluids 140 Degree F or less, other than chilled water piping, do not insulate flanges, unions, strainers, flexible connections and expansion joints. Bevel and seal ends of insulation at such locations. Provide an insert of not less than 6 inches long and of the same thickness and contour as adjoining insulation between the support shield and the piping, but under the finish jacket on piping 2 inches and larger to prevent insulation from sagging at the support points. Inserts shall be factory fabricated of cork or other heavy density insulating material suitable for the planned temperature range. Field applied vapor barrier clad material is also approved.
- G. Jackets:
1. Concealed Indoor Piping Conveying Fluids Above Ambient Temperature: Insulated pipes shall be either provided with a standard jacket containing a factory applied vapor retardant or a field applied vapor barrier clad material. Fittings, unions and valves shall be insulated with insulation of like material and thickness as adjoining pipe and finished with glass cloth and adhesive. PVC jackets are **PROHIBITED**.
  2. Concealed Indoor Piping Conveying Fluids Below Ambient Temperature: Insulated pipes conveying fluids below ambient temperature shall be either provided with a field applied standard jacket containing a factory applied vapor retardant or a field applied vapor barrier clad material. Fittings, unions and valves shall be insulated with insulation of like material and thickness as adjoining pipe and finished with glass cloth and adhesive. PVC jackets are **PROHIBITED**.
  3. Exposed Indoor Piping: Insulated pipes, fittings, unions and valves in mechanical rooms or in finished areas shall be provided with a canvas jacket and painted. Field applied vapor barrier clad material is also approved. PVC jackets are **PROHIBITED**.
  4. Exterior Piping: Insulated pipes shall be either provided with a factory applied vapor retardant jacket covered with an aluminum jacket with seams located on the bottom side on horizontally installed piping or field applied vapor barrier clad material. Fitting, unions and valves shall be insulated with insulation of like material and thickness as adjoining pipe and finished with fibrous glass mesh cloth, reinforced vapor cement and covered with an aluminum jacket.
- H. Insulate anchors and hangers which are secured directly to cold piping as specified for a minimum distance of 8 inches from the surface of the pipe insulation sufficient to prevent sweating.
- I. Hot Water Piping: Cover fittings and valves with equivalent thickness of insulation material. Apply adhesive to butt joints. For valves and fittings on exposed piping, apply hydraulic setting cement paste over insulating material before applying canvas covering.
- J. Where possible, slide foam plastic or elastomeric pipe insulation on condensate drain, chilled water runouts and refrigerant suction piping without splitting insulation. Where insulation is split, use insulation manufacturer's adhesive to cement joints together. Secure all longitudinal joints and seams with 18 gauge copper weld wire on 18 inch centers and secure transverse

joints with manufacturer's tape. Insulate all fittings with fabricated pipe insulation.

- K. Cover insulation exposed to outdoor exterior weather with 0.016 inch aluminum jacket with 1/2 inch wide aluminum bands on 8 inch centers. Lap joints 3 inches minimum and seal with compatible waterproof lap cement.
- L. Cover insulation exposed to outdoor weather with UV resistant, five ply self-adhesive vapor and weather barrier jacket without the use of any additional mechanical attachments. Field applied lap joints a minimum of 3 inches.
- M. If Armacell Armaflex AP or equivalent insulation is used in non-plenum areas, finish with two coats of white vinyl latex paint as recommended by the manufacturer wherever exposed or insulate with a UV resistant, five ply self-adhesive vapor barrier/weatherproof clad material. If the UV resistant, vapor barrier clad material is provided, the two coats of white latex paint shall not be required. Exposed is deemed to mean wherever exposed to view and outdoor weather other than mechanical equipment rooms. Piping concealed by other exposed piping is considered exposed.
- N. Repair separation of joints or cracking of insulation due to thermal movement of poor workmanship.
- O. Insulate all appurtenances such as thermometer stems, drain valves, gauge cock stems, etc. on chilled water lines with removable IMCOA FLEX caps and/or NO DRIP moldable tape.

**3.3 SCHEDULE**

<u>Pipe Content</u>	<u>Type</u>	<u>Nominal Pipe Size</u>	<u>Thickness (in)</u>
Domestic Cold Water Supply	None	N/A	N/A
Domestic Hot Water Supply	A	Thru 1-1/2 inches	3/4 inch
Domestic Recirculating Hot Water	A	Thru 1-1/2 inches	1/2 inch
Chilled Water (Interior Above Grade)	C	Thru 4 inches	1-1/2 inch
Chilled Water (Interior Above Grade)	C	Over 4 inches	2 inches
Chilled Water (Ext. Above Ground)	E	All	2 inches
Chilled Water (Underground)	D	All	2 inches
Condensate Drains	B	All	3/4 inch
Refrigeration Line (Suction)	B	All	1/2 to 3/4 inch
Refrigeration Line (Hot Gas)	B	All	1/2 to 3/4 inch

**END OF SECTION**

## SECTION 15100

### VALVES

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Valves.

##### **1.2 RELATED SECTIONS**

- A. Section 15075 - Mechanical Identification.
- B. Section 15105 - Plumbing Piping.
- C. Section 15183 - Hydronic Piping.
- D. Section 15430 - Plumbing Specialties.

##### **1.3 QUALITY ASSURANCE**

- A. Valves: Valves and cocks may not be indicated in every instance on the plans, but whether shown or not, all valves, cocks and check valves necessary for the proper operation of the system shall be furnished and installed. Valves shall have rising stems except in locations where space is limited. At those locations, non-rising stem valves of equivalent material and pressure class will be accepted. Valves shall have the manufacturer's name or trademark, pressure rating and size indicated by raised letters cast on the valve body.
- B. Valves shall have pressure and temperature ratings equal to or exceeding the piping to which they will be connected to except that the valves shall be designed for a minimum Steam Working Pressure (SWP) of 125 PSIG and a Water-Oil-Gas Pressure (WOG) of 200 PSIG.
- C. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- D. Welders Certification: Submit a copy of the Welding Procedure Specification with the Procedure Qualification Record and certificates of the welders and welding operators required under provisions of ANSI/ASME Section 9 and ANSI/AWS D1.1. Welders shall be tested and have been certified within the last two years by the National Certified Pipe Welding Bureau or other recognized testing agency acceptable to the Project Consultant. A copy of each welder's certification shall be available at the job site.
- E. Grooved piping shall be approved for above grade chilled water piping in mechanical rooms only. For such installations, grooving tool and all grooved couplings, fittings, valves shall be provided by the same manufacturer.

##### **1.4 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.

- B. Include data on pipe materials, pipe fittings, valves and accessories. For grooved joint piping, the couplings, valves and fittings shall be shown on the drawings and submittals and be specifically identified with the applicable manufacturer's style or series number.
- C. Include welder's certification of compliance with ANSI/ASME Section 9.
- D. Submit manufacturer's installation instructions under provisions of Section 01330 - Submittal Procedures.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- B. Store and protect products under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- C. Deliver and store valves in shipping containers with labeling in place.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS - COPPER PRESSED FITTINGS & TOOL FOR DOMESTIC WATER**

- A. Viega NA (Bedford, MA) & Rigid Tool Company (Elyria, OH)
- B. Elkhart Products (Geneva, IN)
- C. JoPress (Warren, MI) & Rigid Tool Company (Elyria, OH)

### **2.2 ACCEPTABLE MANUFACTURERS - GROOVED JOINT COUPLINGS, FITTINGS & VALVES (Mechanical Rooms Only)**

- A. Victaulic (Easton, PA)

### **2.3 ACCEPTABLE MANUFACTURERS - VALVES**

- A. Boston
- B. Nibco
- C. Apollo
- D. Hills-McCanna
- E. DeZurick
- F. Jomar
- G. Milwaukee

### **2.4 ACCEPTABLE MANUFACTURERS - PLUG VALVE**

- A. Rockwell-Nordstrom

- B. Reson

## **2.5 ACCEPTABLE MANUFACTURERS - CHECK VALVE**

- A. Nibco
- B. Mueller
- C. Milwaukee

## **2.6 ACCEPTABLE MANUFACTURERS - RELIEF VALVE**

- A. Watts
- B. Wilkens
- C. Sarco

## **2.7 FLANGES, UNIONS AND COUPLINGS**

- A. Pipe Size 2 Inches and Under (Soldered): 150 PSIG malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.
- B. Pipe Size 2 Inches and Under (Grooved): 300 PSIG stainless steel unions for grooved piping for Victaulic Vic Press 304.
- C. Pipe Size Over 2 Inches: 150 PSIG forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service; 1/16 inch thick preformed neoprene bonded. Where grooved piping is utilized, unions shall not be required as couplings shall serve in their place.
- D. Pipe Size Over 2 Inches (Grooved): Where grooved piping is utilized, unions shall not be required as couplings shall serve in their place.
- E. Dielectric Connections:
  - 1. Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
  - 2. Waterway with carbon steel or ductile iron body, grooved, zinc electroplated with LTHS high temperature stabilized polyolefin polymer liner, plain or threaded ends; Victaulic Style 47.

## **2.8 GATE VALVE**

- A. Up to 2 Inches (Soldered or Threaded): MSS-SP-80, Class 150, bronze body and union bonnet, heavy-duty rising stem and malleable handwheel, inside screw, solid wedge disc, brass packing gland, teflon or graphite packing, threaded ends or solder ends for copper pipe.
- B. Over 2 Inches (Flanged): MSS-SP-70, Class 125, cast iron body and bonnet, bronze trim, solid cast iron wedge, brass alloy stem, cast iron handwheel, OS&Y, flanged ends.

## **2.9 BALL VALVE**

- A. Up to 2 Inches (Soldered or Threaded): MSS-SP-110, rated for 150 PSI SWP and 600 PSI WOG, bronze body, corrosion resistant ball, full flow port,

teflon seat and seals, separate packing nut, lever handle, balancing stops, extended neck.

- B. Up to 2 Inches (Pressed): MSS-SP-110, rated for 150 PSI SWP and 600 PSI WOG, bronze body, corrosion resistant ball, full flow port, teflon seat and seals, separate packing nut, lever handle, balancing stops, extended neck.
- C. Up to 2 Inches (Grooved): MSS-SP-110, rated for 300 PSI CWP, forged brass body, chrome plated brass ball and stem, standard flow port, teflon seat and stem washer, flouroelastomer O-ring, lever handle, Victaulic Series 589.
- D. Up to 2 Inches (Grooved): MSS-SP-110, rated for 300 PSI CWP, stainless steel body, ball and stem, full flow port, PTFE seat, stainless steel lever handle, plain ends; Victaulic Series 569.
- E. Over 2 Inches (Flanged): Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle, flanged ends.
- F. Over 2 Inches (Grooved): Ductile iron body, chrome plated carbon steel ball and stem, teflon seat, fluoroelastomer seals, lever handle, grooved ends; Victaulic Series 726.

## **2.10 GLOBE VALVE**

- A. Up to 2 Inches (Soldered or Threaded): MSS-SP-80, Class 125, bronze body and screwed bonnet, non-rising stem and malleable handwheel, inside screw, renewable composition disc, brass packing gland, soldered or threaded ends with backseating capacity.
- B. Over 2 Inches (Flanged): MSS-SP-85, Class 125, cast iron body and bolted bonnet, bronze trim, rising stem and cast iron handwheel, OS&Y, plug type disc, flanged ends, renewable seat and disc.

## **2.11 BUTTERFLY VALVE**

- A. Over 2 Inches: MSS-SP-67, full lug ductile iron body, bronze or stainless steel disc, EPDM liner, stainless steel stem, resilient replaceable seat for service to 250 Degree F, wafer or lug ends, extended neck, ten position lever handle for 6 inch valves or smaller or handwheel and gear drive for valves 8 inches and larger unless otherwise noted, rated for 200 PSIG bi-directional differential pressure and a dead end service rating of 200 PSIG with the downstream flange removed. Extended neck shall extend beyond insulation for unobstructed operation. Gear operators shall be provided on valves at pumps and chilled water inlet and outlet.
- B. Over 2 Inches (Grooved): MSS-SP-67, lug ductile iron body, electroless nickel plated ductile iron disc, offset stainless steel stem to provide 360 degree seating, pressure responsive replaceable seat for service to 230 Degree F, grooved ends, extended neck, ten position lever handle for 6 inch valves or smaller or handwheel and gear drive for valves 8 inches and larger, rated for 300 PSIG bi-directional differential pressure and a dead end service

rating. Extended neck shall extend beyond insulation for unobstructed operation. Gear operators shall be provided on valves at pumps and chilled water inlet and outlet; Victaulic Vic-300 MasterSeal.

## **2.12 PLUG VALVE**

- A. Up to 2 Inches: Bronze body, bronze tapered plug, non-lubricated, teflon packing, threaded ends with one wrench operator for every ten plug cocks.
- B. Over 2 Inches (Flanged): Cast iron body and plug, pressure lubricated, teflon packing, wrench operator with set screw, flanged ends.

## **2.13 SWING CHECK VALVE**

- A. Up to 2 Inches (Soldered or Threaded): Bronze body, bronze trim, 45 degree swing disc, soldered or threaded ends.
- B. Over 2 Inches (Flanged): Cast iron body, bronze trim, 45 degree swing disc, renewable disc and seat, flanged ends.
- C. Over 2 Inches (Grooved): Ductile iron body, Type 316 stainless steel clapper, synthetic rubber bumper and bonnet, seals suitable for intended service, stainless steel wetted parts, grooved ends; Victaulic Series 712.

## **2.14 SPRING LOADED CHECK VALVE**

- A. Iron body, bronze trim, spring loaded, renewable composition disc, soldered or threaded, wafer or flanged ends.
- B. Silent Check Valve: Cast iron body, bronze trim, stainless steel spring, renewable composition disc, threaded or flanged ends; Model F-910 manufactured by Nibco or Model 91AP manufactured by Mueller.
- C. Over 2 Inches (Grooved): Non-slam, silent type, ductile iron body, stainless steel spring and shaft, aluminum bronze or elastomer encapsulated ductile iron disc, PPS coated or weld-in nickel seat, grooved ends; Victaulic Series 716.

## **2.15 RELIEF VALVE**

- A. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled; Model 131W manufactured by Sarco.

# **PART 3 EXECUTION**

## **3.1 PREPARATION**

- A. Ream pipe and tube ends where applicable and remove burrs prior to installing valves.

## **3.2 INSTALLATION**

- A. Install specialties under provisions of the manufacturer's instructions.



- B. Provide non-conducting dielectric connections whenever jointing dissimilar metals.
- C. Grooved type piping, fittings, valves, couplings shall only be approved for installation in mechanical rooms.
- D. Provide full flow ball valves on all domestic water piping for shutoff and to isolate plumbing fixtures, equipment, part of system or vertical risers. The use of gate valves is **PROHIBITED**.
- E. Provide clearance for installation of insulation and access to valves and fittings. Valves in insulated piping shall be provided with extended necks in order to clear the insulation.
- F. Install valves with stems upright or horizontal, not inverted.
- G. Use 3/4 inch flush mounted anti-siphon wall hydrants for all indoor and outdoor applications. 3/4 inch hose bibbs shall be provided for mechanical rooms only.
- H. Butterfly valves 4 inches and smaller shall have a steel lever latch type actuator capable of infinite position or minimum of ten locking positions with an adjustable memory stop.
- I. Butterfly valves 5 inches and larger shall have enclosed gear type actuator with chain wheel or crank type operating mechanism, adjustable opening and closing memory stops, and position indicator.
- J. All butterfly valves 4 inches and larger and plug valves 6 inches and larger located more than seven feet above finished floor shall be provided with a chain wheel and chain extending to within 12 inches above finished floor.
- K. Install triple-duty pump discharge valve or grooved tri-service valve assembly as manufactured by Victaulic on each pump discharge in a horizontal or vertical attitude with the stem in the upward position allowing clearance above the stem for the check valve mechanism removal.
- L. On grooved end piping installations inside the mechanical rooms, all valves and specialties shall be the products of the same manufacturer. Grooved ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing.
- M. The grooved piping system's factory trained representative shall provide onsite training for the Contractor's field personnel in the use of grooving tools, application of groove and installation of grooved joint products. The representative shall visit the jobsite periodically and review the installation. The Contractor shall remove and replace any joints deemed improperly installed by the representative.

## END OF SECTION

**SECTION 15105**  
**PLUMBING PIPING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Pipe and pipe fittings.
- B. Sanitary sewer piping.
- C. Domestic water piping.
- D. Storm water piping.

**1.2 RELATED SECTIONS**

- A. Division 2 - Sitework.
- B. Section 15060 - Hangers and Supports.
- C. Section 15075 - Mechanical Identification.
- D. Section 15089 - Piping Insulation.
- E. Section 15100 - Valves.
- F. Section 15430 - Plumbing Specialties.

**1.3 REFERENCES**

- A. ANSI/ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings-DWV.
- B. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings, Classes 150 & 300.
- C. ANSI/AWS D1.1 - Structural Welding Code.
- D. ANSI/ASTM B32 - Specification for Solder Metal.
- E. ASTM A53 - Specification for Pipe, Steel, Black and Hot-dipped, Zinc Coated Welded and Seamless.
- F. ASTM A74 - Specification for Cast Iron Soil Pipe and Fittings.
- G. ASTM B88 - Specification for Seamless Copper Water Tube.
- H. ASTM B306 - Specification for Copper Drainage Tube (DWV).
- I. ASTM C564 - Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- J. ASTM D635 - Flame Retardant.

- K. ASTM D2665 – Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
- L. ASTM D2683 - Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
- M. ASTM D2846 - Specification for Chlorinate Poly (Vinyl Chloride) (CPVC) Plastic Hot and Cold Water Distribution Systems.
- N. AWWA C601 - Standard Methods for the Examination of Water and Waste Water.
- O. CISPI 301 - Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.

#### **1.4 QUALITY ASSURANCE**

- A. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- B. Welders Certification: Submit a copy of the Welding Procedure Specification with the Procedure Qualification Record and certificates of the welders and welding operators required under provisions of ANSI/ASME Section 9 and ANSI/AWS D1.1. Welders shall be tested and have been certified within the last two years by the National Certified Pipe Welding Bureau or other recognized testing agency acceptable to the Project Consultant. A copy of each welder’s certification shall be available at the job site.
- C. Grooved piping shall be approved for above grade chilled water piping in mechanical rooms only. For such installations, grooving tool and all grooved couplings, fittings, valves shall be provided by the same manufacturer.
- D. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:
  - 1. ASME
  - 2. ASTM
  - 3. NEMA
  - 4. UL
  - 5. CSA

#### **1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.
- B. Include data on pipe materials, pipe fittings, valves and accessories.
- C. Submit manufacturer's installation instructions under provisions of Section 01330 - Submittal Procedures.

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- B. Store and protect products under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- C. Deliver and store valves in shipping containers with labeling in place.

**PART 2 PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS - FERROUS PIPING**

- A. Tyler (Tyler, TX).
- B. Charlotte Pipe & Foundry Company (Charlotte, NC).
- C. AB&I Foundry (Oakland, CA).

**2.2 ACCEPTABLE MANUFACTURERS - COPPER PRESSED FITTINGS & TOOL FOR DOMESTIC WATER**

- A. Viega NA (Bedford, MA) & Rigid Tool Company (Elyria, OH)
- B. Elkhart Products (Elkhart, IN) & Rigid Tool Company (Elyria, OH)
- C. JoPress (Warren, MI) & Rigid Tool Company (Elyria, OH)
- D. Cello Products (Cambridge, ON)

**2.3 ACCEPTABLE MANUFACTURER - CPVC PIPING FOR CHEMICAL (ACID) WASTE**

- A. Spears Manufacturing Co. (Slymar, CA)
- B. Charlotte Pipe (Charlotte, NC)

**2.4 GENERAL**

- A.** The use of PVC piping is limited to underground sanitary, grease waste and storm drain systems. The use of PVC piping for above grade installation in the building interior is **PROHIBITED**.

**2.5 DOMESTIC WATER PIPING**

- A. Copper Piping (Underground Building Exterior): ASTM B88, Type K, hard drawn.
  - 1. Fittings:
    - (a) Soldered: ANSI/ASME B16.29, wrought copper.
    - (b) Pressed: ASME B16.18 or ASME B16.22, copper press fitting with EPDM O-ring and Smart Connect (SC Feature).
  - 2. Joints:
    - (a) Soldered: ANSI/ASTM B32, lead-free solder, Grade 95TA.

- (b) Pressed: ASME B16.18 or ASME B16.22, copper press fitting with EPDM O-ring and Smart Connect (SC Feature).
- B. Copper Piping (Underground Under Building Slab): ASTM B88, Type K, soft drawn.
  - 1. Fittings:
    - (a) Soldered: ANSI/ASME B16.29, wrought copper.
    - (b) Pressed: ASME B16.18 or ASME B16.22, copper press fitting with NSF listed EPDM O-ring and Smart Connect (SC Feature).
  - 2. Joints:
    - (a) Soldered: ANSI/ASTM B32, lead-free solder, Grade 95TA.
    - (b) Pressed: ASME B16.18 or ASME B16.22, copper press fitting with NSF listed EPDM O-ring and Smart Connect (SC Feature).
- C. Copper Piping (Above Grade): ASTM B88, Type L, hard drawn.
  - 1. Fittings:
    - (a) Soldered: ANSI/ASME B16.23, cast brass or ANSI/ASME B16.29, wrought copper.
    - (b) Pressed: ASME B16.18 or ASME B16.22, copper press fitting with NSF listed EPDM O-ring and Smart Connect (SC Feature).
  - 2. Joints:
    - (a) Soldered: ANSI/ASTM B32, lead-free solder, Grade 95TA.
    - (b) Pressed: ASME B16.18 or ASME B16.22, copper press fitting with NSF listed EPDM O-ring and Smart Connect (SC Feature).

## **2.6 SANITARY & GREASE SEWER PIPING**

- A. Cast Iron Pipe (Underground): ASTM A74, service weight. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Pipe Institute and listed by NSF.
  - 1. Fittings: Cast iron.
  - 2. Joints: Hub-and-spigot, CISPI compression type with ASTM C564 neoprene gaskets.
- B. Cast Iron Pipe (Above Grade): CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron.
  - 2. Joints: CISPI 310 & NSF Certified neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe (Underground): ASTM D1784 and ASTM D1785, solid wall, Schedule 40.
  - 1. Fittings: ASTM D2665, PVC DWV.
  - 2. Joints: ASTM D2855, solvent cement.
- D. Copper Piping: ASTM B306, DWV.
  - 1. Fittings: ANSI/ASME B16.3 cast bronze or ANSI/ASME B16.29, wrought copper.
  - 2. Joints: ANSI/ASTM B32, solder, Grade 50B.

## **2.7 STORM WATER PIPING**

- A. Cast Iron Pipe (Underground): ASTM A74, service weight. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Pipe Institute and listed by NSF.
  - 1. Fittings: Cast iron.
  - 2. Joints: Hub-and-spigot, CISPI compression type with ASTM C564 neoprene gaskets.
- B. Cast Iron Pipe (Above Grade): CISPI 301, hubless.
  - 1. Fittings: Cast iron.
  - 2. Joints: CISPI 310 & NSF Certified neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe (Underground): ASTM D2729, solid wall, Schedule 40.
  - 1. Fittings: ASTM D2665, PVC.
  - 2. Joints: ASTM D2855, solvent cement.
- D. Horizontal, above grade storm drain piping shall be sloped at 1/8 inch per foot for sizes greater than 2-1/2 inches.

## **2.8 HYDRONIC PIPING**

- A. Refer to Section 15183 - Hydronic Piping.

## **2.9 DIELECTRIC ISOLATOR**

- A. Non-conducting dielectric couplings shall be rated for a minimum of 150 percent of the maximum working pressure of the piping system and a minimum of 50 Degree F higher than the maximum operating temperature of the piping system in which they are installed. Couplings shall be electroplated steel or brass with inert, non-corrosive thermoplastic lining or bronze fittings.
- B. Coupling shall be as manufactured by Watts, Grinnel, Epco or approved equal.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Ream pipe and tube ends where applicable and remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.

- C. Prepare piping connections to equipment with flanges or unions.
- D. Size the storm water piping for a rainfall intensity of 4.5 inches per hour for a 100 hundred year storm and not be less than 4 inches in size.

### 3.2 INSTALLATION

- A. Provide non-conducting dielectric couplings whenever jointing dissimilar metals to prevent electrolysis or galvanic corrosion. Dielectric couplings shall be rated for at least 150 percent of the maximum working pressure of the piping system and at least 50 Degree F higher than the maximum operating temperature of the piping system in which they are installed. Couplings shall be electroplated steel or brass with inert and non-corrosive thermoplastic lining or bronze fittings.
- B. Install all underground thermoplastic piping systems in accordance with ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.
- C. Plastic-to-metal transitions shall be accomplished by flanges or unions specifically manufactured for that purpose.
- D. Route piping in orderly manner and maintain gradient.
- E. Install piping to conserve building space and not interfere with use of space. Installation of piping in cores of exterior cement block walls is prohibited.
- F. Group piping whenever practical at common elevations.
- G. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.
- H. Provide full flow ball valves on all domestic water piping for shutoff and to isolate plumbing fixtures, equipment, part of system or vertical risers. The use of gate valves is **PROHIBITED**.
- I. Install unions downstream of valves and at equipment or apparatus connections.
- J. On copper piped systems, install brass male adapters on each side of valves. Sweat solder adapters to pipe with lead-free solder.
- K. Joint connections for joining domestic water pipe shall be **FREE OF LEAD** and the 95/5 solder and flux not have a lead content exceeding 0.2 percent.
- L. Provide clearance for installation of insulation and access to valves and fittings.
- M. Provide properly sized thrust blocks at all fittings of the domestic water and fire main pressure piping at every change in direction or wherever required. Thrust blocks shall bear on and against undisturbed or properly compacted soil. Provide temporary thrust blocking for testing at piping end points and other points as required.

- N. Establish invert elevations of buried piping outside the building to ensure a minimum of not less than twenty-four inches of cover for ductile iron, steel, cast iron, CPVC, PVC piping (domestic water, sanitary, chemical waste and storm drain systems) and thirty-six inches for steel or polyethylene piping (chilled water and gas).
- O. Where pipe support members are welded to structural building framing, scrape, brush clean and apply one coat of zinc rich primer to welding.
- P. Prepare pipe, fittings, supports and accessories not prefinished, ready for finish painting under provisions of Division 9.
- Q. Install bell and spigot pipe with bell end upstream.
- R. Install valves with stems upright or horizontal, not inverted.
- S. Do not penetrate domestic water piping used for electrical grounding through and into the electrical rooms. Terminate the pipe outside of the electrical room and provide ground straps.
- T. Do not install or run domestic water piping, chilled water piping, etc. through electrical rooms. With the exception of the fire sprinkler piping, this also applies to the equipment room and the telecommunication rooms.
- U. Use 3/4 inch flush mounted anti-siphon wall hydrants for all indoor and outdoor applications. 3/4 inch hose bibbs shall be provided for mechanical rooms only
- V. Run chemical waste from the high school chemistry classrooms, science classrooms, science material storage/preparation area and the photography dark room through a high density polyethylene neutralizing tank before being discharged into the sanitary sewage system. Provide the tank with a bolt-down cover similar to the Enfield Series T Neutralization tank.
- W. Floor drains throughout the facility shall be 3 inches in size. Provide all floor drain P-traps with trap primers in order to prevent evaporation of the trap seal with the exception of the mechanical rooms, kitchen and all exterior area drains. Primers shall be connected to the water closet flush valve. If a flush valve is not available, connect primer to the tailpiece of a lavatory or sink, or the water supply piping.
- X. The mechanical rooms and the kitchen shall be provided with 3 inch floor drains without P-trap primer connections due to the constant flow of condensate from the air handling units.
- Y. Provide each horizontal drainage pipe with a cleanout at the upstream end of the pipe.
- Z. Provide each building sanitary sewer drain with a two-way cleanout within five feet after exiting the building. If located in grass areas, embed the two-way cleanout in an 18"x18"x6" concrete pad.



- AA. Provide cleanouts at 50 feet intervals for straight runs of underground horizontal sanitary and grease drain systems of 3 inches or less. For sanitary or grease drain systems of 4 inches and larger, provide cleanouts at no more than 100 feet apart.
- BB. For buildings designed with an interior storm drain system, provide cleanouts with access covers at the base of the vertical riser for above grade storm rain piping and connect directly to the storm drain system. The use of interior storm drain piping shall be limited, but should that design concept be used...the interior storm drain piping shall be insulated. Buildings designed with an exterior storm drain system shall also be connected directly to the storm drain system.
- CC. Provide a secondary emergency roof drain system totally independent of the primary roof drain system in accordance with code. System may consist of parapet scuppers, rain water leaders, etc. and discharge onto grade. Discharge of the primary roof drain system shall be into the storm drain system while discharge of the secondary roof drain system shall be onto grade.
- DD. Offset sanitary system cleanouts so that they are not located in classrooms or building entrances. Use floor cleanouts whenever possible.
- EE. All underground black steel piping shall be thoroughly cleaned such as the removing of rust, etc. prior to being coated or encapsulated with a corrosion resistant material.
- FF. Establish invert elevations and maintain gradients.
- GG. Excavate under provisions of Division 2 of this Section.
- HH. Backfill under provisions of Division 2 of this Section.

### **3.3 PRESSURE TESTING OF PIPING**

- A. Test piping at pressure listed below:
  - 1. Hydrostatic Pressure Test:
    - (a) Sanitary and Roof Drainage Piping: Tested under the requirements of the Florida Building Code - Plumbing, but not less than equivalent to 10 feet of water.
    - (b) Water Piping: 1-1/2 times the operating pressure, but not less than 100 PSIG at the top most outlet.
- B. Adjust all piping, hangers and related devices after systems have reached normal operating temperatures.

### **3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- A. Disinfection shall be performed at each individual building.
- B. All lead testing to be performed in accordance with EPA and the Broward County Health Department Standards and Regulations and meet or exceed their allowable safe drinking water parameters.

- C. Prior to starting work, verify system is complete, flushed and clean.
- D. Ensure pH of water to be treated is correct.
- E. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- F. Maintain disinfectant in system for 24 hours.
- G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- H. Flush disinfectant from system until residual is equal to that of incoming water or 1.0 mg/L.
- I. Bleed water from outlets to ensure distribution and test for contaminants and lead content at all the remote locations and at several intermediate locations. Test locations shall be at the service entry to the property line, the water entry at each building and at the most remote locations of the constructed domestic water piping system.
- J. Take water sample no sooner than 48 hours after flushing at each building and analyze in accordance with AWWA C651.
- K. All water samples for lead sampling shall be 250 mL in volume. Sampling bottles shall be obtained from the Contractor's certified drinking water laboratory.
- L. Testing of the water samples shall be performed by the Contractor's certified drinking water laboratory in coordination with the SBBC Risk Management Department.

### **3.5 SERVICE CONNECTIONS**

- A. Provide new sanitary sewer service by connecting to existing sewer main. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and earth cover.
- B. Provide new water service complete with approved reduced pressure backflow preventer and water meter by connecting to existing water main.
- C. Provide sleeve in wall for water service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

### **END OF SECTION**

**SECTION 15183**  
**HYDRONIC PIPING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Chilled water pipe and fittings.
- B. Pre-insulated chilled water pipe and fittings.

**1.2 RELATED SECTIONS**

- A. Section 21 05 29 - Hangers and Supports.
- B. Section 21 05 49 - Mechanical Sound and Vibration Control.
- C. Section 21 05 53 - Mechanical Identification.
- D. Section 21 07 19 - Piping Insulation.
- E. Section 22 05 06 - Valves.
- F. Section 23 21 24 - Hydronic Specialties.
- G. Section 23 25 00 - Chemical Treatment System.

**1.3 REFERENCES**

- A. ANSI/ASME Section 9 - Welding and Brazing Qualifications.
- B. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 & 300.
- C. ANSI/ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- D. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- E. ANSI/ASTM D2466 - Specifications for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- F. ASTM A53 - Specifications for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated (Galvanized) Welded and Seamless.
- G. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless.
- H. ASTM B32 - Specifications for Solder Metal.
- I. ASTM B88 - Specifications for Seamless Copper Water Tube.
- J. ASTM A312 - Seamless and Welded Austenitic Stainless Steel Pipe.
- K. ASTM A536 - Ductile Iron Castings.

- L. AWWA C606 - Standards for Grooved and Shouldered Joints.

#### **1.4 REGULATORY REQUIREMENTS**

- A. Conform to ANSI/ASME B31.9.

#### **1.5 QUALITY ASSURANCE**

- A. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- B. Welders Certification: Under provisions of ANSI/ASME Section 9 and ANSI/AWS D1.1.
- C. Grooved piping shall be approved for above grade chilled water piping in mechanical rooms only. For such installations, grooving tool and all grooved couplings, fittings, valves shall be provided by the same manufacturer.

#### **1.6 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.
- B. Include data on pipe materials, pipe fittings, valves and accessories. For grooved joint piping, the couplings, valves and fittings shall be shown on the drawings and submittals and be specifically identified with the applicable manufacturer's style or series number.
- C. Include welders certification of compliance with ANSI/ASME Section 9.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- B. Store and protect products under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- C. Deliver and store valves in shipping containers with labeling in place.

### **PART 2 PRODUCTS**

#### **2.1 ACCEPTABLE MANUFACTURERS - PRE-INSULATED PIPING**

- A. Thermacor.
- B. Perma-Pipe.
- C. Rovanco.
- D. Cell-U-Foam.
- E. Energy Task Force.
- F. Armaflex

## 2.2 CHILLED WATER PIPING (Above Grade - Field Insulated )

- A. Field Insulated Steel Pipe:
1. Steel Pipe: ASTM A53 or A120, Schedule 40 black steel.
  2. Fittings: ANSI/ASTM B16.3, long radius, malleable iron or ASTM A234, forged steel welding type.
  3. Standard Couplings: ASTM A536 ductile iron housings, pressure sensitive synthetic rubber gasket (grade to suit the intended service) and plated steel bolts and nuts.
    - (a) Rigid Type: Coupling housings cast with offsetting, angle pattern bolt pads to provide system rigidity and support, hung in accordance with ASME B31.1 and B31.9; Victaulic Style 07.
    - (b) Flexible Type: Use in locations where vibration attenuation and stress relief are required. Flexible couplings may be used in lieu of flexible connectors at equipment connections. Three couplings for each connector shall be placed in close proximity to the source of vibration; Victaulic Style 75 or 77.
  4. Flanged Adapters: Victaulic flange adapters shall be ASTM A536 ductile iron, flat faced for incorporating flanged components with ANSI Class 125, 150 and 300 bolt-hole patterns to a grooved piping system; Victaulic Style 741 or 743.
  5. Joints: Threaded for pipe 2 inches and under or ANSI/AWS D1.1 welded for pipe over 2 inches.
- B. Field Insulated Copper Pipe:
1. Copper Tubing: ASTM B88, Type L, hard drawn.
  2. Fittings:
    - (a) ANSI/ASME B16.23, long radius, cast brass or ANSI/ASME B16.29 solder wrought copper.
    - (b) ASTM A536 ductile iron or ASTM A53 forged or fabricated steel fittings with standard or Victaulic AGS wedge shaped grooves designed to accept Victaulic standard or W series couplings.
  3. Joints: ASTM B32, lead-free solder, 95-5 tin-antimony or tin-silver with melting range of 430 to 535 Degree F; ANSI/AWS A5.8, brazed, BCuP silver/phosphorous/copper alloy with melting range of 1190 to 1480 Degree F
- C. Insulation: Refer to Section 15089 - Piping Insulation.

## 2.3 CHILLED WATER PIPING (Underground - Pre-Insulated)

- A. Field Insulated Pipe:
1. Steel Pipe: ASTM A53 or A120, Schedule 40 black steel.
  2. Fittings: ANSI/ASME 16.3, long radius, malleable iron or ASTM A234, forged steel welding type.
  3. Joints: Threaded for pipe 2 inches and under or ANSI/AWS D1.1 welded for pipe over 2 inches.
  4. Insulation: Refer to Section 15089 - Piping Insulation.
- B. Pre-Insulated Pipe:
1. Steel Pipe: ASTM A-53 Grade B, electric resistance welded or seamless for sizes 5 inch and larger or ASTM A-120/A-53, Grade A, continuous welded for 4 inch and smaller, Schedule 40 black steel.

- (a) 90-95 percent closed cell polyurethane foam insulation of 2.5 to 3.5 PCF density.
- (b) "K" value of 0.14 at 75 Degree F.
- 2. Fittings: Factory prefabricated and pre-insulated with pre-cut sectional urethane foam to the thickness specified, covered with PVC jacket with joints sealed with polyethylene backed, pressure sensitive 30 mil thick butyl rubber tape.
- 3. Jacket: ASTM D-1784, PVC, wall thickness ten times nominal jacket diameter, but not less than 60 mils.
- 4. Pipe ends insulated with pre-cut sectional urethane foam to the thickness specified, covered with PVC jacket with joints sealed with polyethylene backed, pressure sensitive 30 mil thick butyl rubber tape.
- 5. Equivalent to Thermacor "Ferro-Therm".

## **2.4 CONDENSER WATER PIPING (Underground)**

- A. Steel Pipe: ASTM A53 or A120, Schedule 40 black steel.
  - 1. Fittings: ANSI/ASME B16.3, long radius, malleable iron or ASTM A234, forged steel welding type.
  - 2. Joints: Threaded for pipe 2 inches and under; ANSI/AWS D1.1, welded for pipe over 2 inches.

## **2.5 CONDENSER WATER PIPING (Above Grade)**

- A. Steel Pipe: ASTM A53 or A120, Schedule 40 black steel.
  - 1. Fittings:
    - (a) ANSI/ASME B16.3, long radius, malleable iron or ASTM A234, forged steel welding type.
    - (b) ASTM A536 ductile iron or ASTM A53 forged or fabricated steel fittings with standard or Victaulic AGS wedge shaped grooves designed to accept Victaulic standard or W series couplings.
  - 2. Standard Couplings: ASTM A536 ductile iron housings, pressure sensitive synthetic rubber gasket (grade to suit the intended service) and plated steel bolts and nuts.
    - (a) Rigid Type: Coupling housings cast with offsetting, angle pattern bolt pads to provide system rigidity and support, hung in accordance with ASME B31.1 and B31.9; Victaulic Style 07.
    - (b) Flexible Type: Use in locations where vibration attenuation and stress relief are required. Flexible couplings may be used in lieu of flexible connectors at equipment connections. Three couplings for each connector shall be placed in close proximity to the source of vibration; Victaulic Style 75 or 77.
  - 3. Flanged Adapters: Victaulic flange adapters shall be ASTM A536 ductile iron, flat faced for incorporating flanged components with ANSI Class 125, 150 and 300 bolt-hole patterns to a grooved piping system; Victaulic Style 741 or 743.
  - 4. Joints: Threaded for pipe 2 inches and under; ANSI/AWS D1.1, welded for pipe over 2 inches.
- B. Copper Tubing: ASTM B88. Type L, hard drawn.
  - 1. Fittings:
    - (a) ANSI/ASME B16.23, long radius, cast brass or ANSI/ASME B16.29, solder wrought copper.

- (b) ANSI/ASME B16.22, wrought copper with copper tube dimensioned grooved ends. Flaring of tube and fitting ends to IPS dimensions is **PROHIBITED**.
- 2. Couplings: ASTM A536 ductile iron coated with copper colored alkyd enamel, complete with pressure responsive synthetic rubber gasket of a FlushSeal design. Housings cast with offsetting, angle pattern bolt pads to provide rigidity; Victaulic Style 606
- 3. Flange Adapters: ASTM A536 ductile iron castings coated with copper colored enamel, flat faced for direct connection to flanged components with ANSI Class 125 and 150 bolt hole patterns; Victaulic Style 641.
- 4. Grooved copper Mechanical-T shall consist of a cast bronze upper housing with female NPT threaded outlet and locating collar, ductile iron lower housing coated with copper colored enamel and synthetic rubber gasket; Victaulic Style 622.
- 1. Joints: ASTM B32, lead-free solder, 95-5 tin-antimony or tin-silver with melting range of 430 to 535 Degree F; ANSI/AWS A5.8, brazed, BCuP silver/phosphorous/copper alloy with melting range of 1190 to 1480 Degree F.

## **2.6 CONDENSER WATER PIPING (Above Grade At Cooling Tower Only)**

- A. PVC Pipe: ASTM D1785, Schedule 40 UV inhibited PVC for pipe 6 inches and under or Schedule 80 UV inhibited PVC for pipe over 6 inches.
  - 1. Fittings: ASTM D2466 or D2467, PVC.
  - 2. Joints: ASTM D2855, solvent cement.

## **2.7 COOLING TOWER OVERFLOW DRAIN PIPING**

- A. PVC Pipe: ASTM D1785, Schedule 40 UV inhibited PVC.
  - 1. Fittings: ASTM D2466 or D2467, PVC.
  - 2. Joints: ASTM D2855, solvent cement.

## **2.8 EQUIPMENT CONDENSATE DRAIN PIPING**

- A. Copper Tubing: ASTM B88, Type L hard drawn.
  - 1. Fittings: ASTM D2466.
  - 2. Joints: ASTM B32, lead-free solder, 95-5 tin-antimony or tin-silver with melting range of 430 to 535 Degree F; ANSI/AWS A5.8, brazed, BCuP silver/phosphorus/copper alloy with melting range of 1190 to 1480 Degree F.

# **PART 3 EXECUTION**

## **3.1 PREPARATION**

- A. Ream pipe and tube ends where applicable and remove burrs. Bevel or groove plain end ferrous pipe.
- B. Grooved piping shall be approved for above grade chilled water piping in mechanical rooms only. For such installations, grooving tool and all grooved couplings, fittings, valves shall be provided by the same manufacturer.
- C. Prepare piping connections to equipment with grooved couplings, flanges or unions.

- D. Remove dirt and scale on inside and outside before assembly.

## **3.2 INSTALLATION**

- A. Route piping in orderly manner, plumb and parallel to building structure and maintain gradient.
- B. Establish invert elevations of buried chilled water piping outside the building to ensure a minimum depth of not less than 36 inches.
- C. Install piping to conserve building space and not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.
- F. Provide access where valves and fittings are not exposed. Locate valves and metering devices in easily accessible locations having adequate clearance to service devices.
- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- H. Install valves with stems upright, not inverted.
- I. Scrape, brush clean and apply one coat of zinc rich primer to welding joints wherever pipe support members are welded to structural building framing.
- J. Provide clearance for installation of insulation and access to valves and fittings.
- K. Upon completion of the chilled water and condenser water piping installation and prior to insulating the basket strainers, the Contractor shall flush the piping systems with water in order to remove sand and other foreign contaminants. The strainers shall be removed, cleaned and re-installed during this cleaning procedure. The chilled water and condenser water piping shall be chemically cleaned by the Contractor in order to remove mill slag, dirt, oil and/or other foreign contaminants. The strainers shall then be removed again, cleaned and reinstalled. The chilled water and condenser water piping shall then be chemically passivated drained and continued to be flushed until iron levels are detected at 1 ppm or less. Once iron levels have been achieved the Contractor shall call BCPS PPO Water Treatment Department at 754 321-9010 or 954 790-2384 for verification of water iron level and strainer cleaning. Upon approval the BCPS Water Treatment Department will give authorization for the Contractor to charge the hydronic pipe loop with nitrate. Chilled Water piping shall be charged with nitrate to 600 to 800 ppm. Heat Pump condenser piping shall be charged with nitrate to 800 to 1000 ppm. Once nitrate levels have been achieved the Contractor shall call BCPS PPO Water Treatment Department at 754 321-9010 or 954-790-2384 for verification. Upon acceptance of nitrate levels the BCPS PPO Water Treatment Department shall furnish, install and maintain the water chemical treatment system. Refer to Section 15220 - Chemical Treatment System.



- L. Prepare pipe, fittings, supports and accessories for finish painting.
- M. Use copper pipe only for chilled water when within 20 feet of the HVAC unit inside the mechanical room.

### 3.3 APPLICATION

- A. For suspended piping, install drilled concrete anchor fasteners after concrete is placed and completely cured. Powder-actuated stud fasteners for suspended piping in concrete slabs are **PROHIBITED**.
- B. Use fasteners only in accessible locations.
- C. Install grooved couplings or unions downstream of valves and at equipment or apparatus connections.
- D. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- E. Install only ball valves or butterfly valves for shutoff and to isolate equipment, part of systems or vertical risers.
- F. Provide spring loaded silent check valves on discharge of chilled water and condenser water pumps.
- G. Install plug valves for throttling service, bypass or manual flow control services. Use non-lubricated plug valves only when shutoff or isolating valves are also provided.
- H. Use butterfly valves in chilled and condenser water systems interchangeably with gate and globe valves.
- I. Use only ball valves or butterfly valves in chilled and condenser water systems for throttling and isolation service.
- J. Use grooved or lug end butterfly valves to isolate equipment noted as TLB or otherwise required for the removal and maintenance of equipment.
- K. Use dielectric waterways fittings or couplings for dissimilar metals.
- L. Use pipe dope or teflon tape for screwed pipe connections.
- M. Threaded pipe joints to extend 1-1/2 inch into the mating female end.
- N. Provide 3/4 inch ball valves at main shutoff valves, low points of piping, bases of vertical risers and at equipment. Pipe to nearest drain.
- O. The grooved piping system's factory trained representative shall provide onsite training for the Contractor's field personnel in the use of grooving tools, application of groove and installation of grooved joint products. The representative shall visit the jobsite periodically and review the installation. The Contractor shall remove and replace any joints deemed improperly installed by the representative.

**END OF SECTION**

**SECTION 15625**  
**AIR COOLED CHILLER**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Chiller package.
- B. Charge of refrigerant and oil.
- C. Controls and control connections.
- D. Chilled water connections.
- E. Condenser water connections.
- F. Auxiliary water connections.
- G. Starters.
- H. Electrical power connections.

**1.2 RELATED SECTIONS**

- A. Section 23 21 13 - Hydronic Piping.
- B. Section 23 21 24 - Hydronic Specialties.
- C. Section 23 25 00 - Chemical Treatment System.
- D. Section 23 09 01 - HVAC Instrumentation and Controls.
- E. Division 16 - Electrical.

**1.3 REFERENCES**

- A. ANSI/ASHRAE 90A - Energy Conservation in New Building Design.
- B. ANSI/ASME Section 8D - Boiler and Pressure Vessels Code.
- C. ANSI/UL - Central Cooling Air Conditioners.
- D. ARI 550/590 - Standard for Water Chilling Packages Using the Vapor Compression Cycle.

**1.4 SUBMITTALS**

- A. Submit product data under provisions of Section 01330 - Submittal Procedures.

- B. Submit Shop drawings indicating assembly, unit dimensions, weight loading, required clearances, construction details and field connection details.
- C. Submit product data indicating dimensions, weights, capacities, ratings, motor electrical characteristics, chiller performance data as tested in accordance with the latest edition of ARI Standard 550/590 and the type and quantity of refrigerant.
- D. Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory installed and field installed wiring.
- E. Submit operation and maintenance data indicating startup instructions, parts lists, controls and accessories, and troubleshooting guide.

## **1.5 QUALITY ASSURANCE**

- A. Provide air-cooled chiller with manufacturer's name, model number and capacity identified.
- B. Compressor motors, starters, wiring and control wiring all conform to NEMA, UL, NEC and local utility requirements.
- C. During the occupied periods, a voltage imbalance on 3-phase systems (aka. under-voltage) may cause the chiller to shutdown. The calculated phase-to-phase voltage imbalance should be opened up to the FPL recommended values of 3 percent voltage and 30 percent current. In order to protect the chiller and avoid the shutdown, select the chiller motors with operating limits of 480V plus or minus 7.5 percent (444V to 516V) so that they can operate at minimum imbalance settings of plus or minus 2.5 percent voltage and plus or minus 25 percent current. In addition, should protection devices be required, they shall be capable of providing automatic power system range sensing; adjustable trip delay, restart delay and voltage adjustment; imbalance trip indicator; LED status readout and shall be as specified in the SBBC Electrical Design Criteria.
- D. When the existing air-cooled chiller is to be replaced at an existing school facility, the replacement chiller must be specified within the FPL Retrofit Program criteria. This also applies to new chillers installed at new facilities. Under this program, the minimum EER for air-cooled chillers shall be 9.6. FPL will pay a percentage rebate to the SBBC of the cost including labor and materials to install a new chiller or replace the existing chiller and its associated appurtenances. For further information, please contact the FPL Program Specialist at (954) 321-2162.

## **1.6 WARRANTY**

- A. Provide manufacturer's one year parts and labor warranty for all chiller components and an extended four year parts and labor warranty on the compressor and motor. Both warranties beginning from the date of Beneficial Occupancy.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- A. Deliver product to site under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- B. Store and protect product under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- C. Store product in a clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures and finish.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Trane
- B. Carrier
- C. York
- D. District Approved Equal

### **2.2 CHILLER**

- A. Factory assembled and tested outdoor packaged air-cooled liquid chiller furnished complete with multiple screw or scroll compressors, compressor motors, condenser, evaporator, interconnecting refrigerant piping, refrigeration accessories, motor starters, microprocessor control panel including gauges and indicating lights and auxiliary components. Construction and ratings will be in accordance with the latest edition of ARI Standard 550/590.
- B. Unit will have Energy Efficiency Rating (EER) not less than prescribed by ANSI/ASHRAE 90A and, in addition, be specified within the FPL Retrofit Program Under this program, the minimum EER for air-cooled chillers shall be 9.6.
- C. Select motors with the proper nameplate voltage rating of 480 Volt in order to prevent chiller shutdown due to a voltage imbalance on 3-phase systems (AKA. Under-voltage).
- D. Corrosion and Electrolysis: Provide approved corrosion resistant materials and coatings as required for adequate protection of all system components. Separate metals where contact of dissimilar metals may cause corrosion or electroic action, by means of inert materials such as synthetic rubber or plastic materials, grommets and isolation fittings as required.
- E. Capacity Modulation: Provide step capacity control by means of a modulating control device and compressor staging on the leaving water temperature. Screw compressors to be equipped with slide valves or electrically actuated variable step un-loaders.

- F. Furnish the chiller with a suitable structural steel sub-base for mounting the chiller on a concrete foundation.
- G. Alarm Limits: Provide chiller with all the high and low alarm limits to be set on the EM/S system.

### **2.3 COMPRESSOR**

- A. Multiple compressors independent of each other of semi-hermetic design and constructed with heat treated forged steel or ductile iron shafts, fixed compression, rotary screw or scroll type with microprocessor panel. Statically and dynamically balanced rotating parts mounted on spring vibration isolators.
- B. Provide compressor with automatic capacity reduction equipment consisting of suction valve unloaders. Use lifting mechanism operated by solenoid valve. Provide for unloaded compressor start.
- C. Crankcase Heater: Heater to evaporate refrigerant returning to crankcase during shutdown. Energize heater when compressor is not operating.
- D. Motor: Direct drive, hermetic, fixed compression with microprocessor panel. Suction gas cooled, hermetically sealed, squirrel caged induction type with windings designed and insulated for continuous operation at specific service conditions.
- E. Lubrication: Reversible, positive displacement oil pump with oil charging valve, oil level sight glass, oil filter and magnetic plug on strainer arranged to ensure adequate lubrication during starting, stopping and normal operation.

### **2.4 EVAPORATOR**

- A. Dual-circuited shell and tube design, multipass, seamless or welded steel construction with cast iron or fabricated steel heads, seamless copper tubes or red brass tubes with integral fins, rolled or silver brazed into tube sheets.
- B. Design, test and stamp refrigerant side for minimum 225 PSIG working pressure and water side for 150 PSIG working pressure in accordance with ANSI/ASME Section 8.
- C. Fouling Factor: 0.0001 for evaporator tubes.
- D. Factory insulation will be 3/4 inch minimum thick, flexible expanded polyvinyl chloride insulation with maximum "K" value of 0.26. Insulate suction line and accessories below ambient temperature to prevent condensation at all operating conditions.
- E. Provide water drain connection vent and thermometer wells on evaporator for temperature controller and low temperature cutout.
- F. Provide a minimum of two refrigerant circuits on multiple compressor units.

### **2.5 CONDENSER**

- A. Construct condenser coils of aluminum fins mechanically bonded to seamless copper tubing with brazed joints at return bends. Provide sub-cooling circuits with liquid accumulators. Air test under water to 425 PSIG.
- B. Provide vertical discharge, direct driven propeller type condenser fans with fan guard on discharge and factory mounted louvered, galvanized steel coil guard panels.
- C. Fan motors to be permanently lubricated ball bearings and integral current and overload protection.
- D. If damaged, fins shall be straightened. If fins are severely damaged, entire coil shall be replaced.

## 2.6 COIL COATING

- A. Provide the coil tubing, fins and end plates with a factory applied spray-processed coating for corrosion protection.
- B. Ensure coating materials have passed a **MINIMUM OF 1000 HOURS OF SALT SPRAY EXPOSURE** in testing performed by an independent laboratory under provisions of ASTM B117.85 standards.
- C. Ensure the coating material and process as applied to fin tube coils provides an effective corrosion protection in a pH range of 1.0 to 14.0.
- D. Prepare the coils through the manufacturer's procedural cleaning steps allowing for drying prior to the coating process.
- E. Apply a 0.5 to 1.0 dry mil thickness of acrylic polymer resin primer by spray-coating. Coating to be fully cured prior to applying the protective finish coat.
- F. Apply the coil corrosion protection coating by spray application and built-up to a dry mil thickness of 2.0 to 3.0.
- G. Ensure the corrosion protection coating is built-up on the fin edges with a final four-step spray coating process applied to both sides of the coil.
- H. Provide protection for the coil tubes from fluid infiltration during the coating process by maintaining a 50 PSI blanket of nitrogen on the fluid side.
- I. Ensure the coating is field-repairable and provide touchup product for this purpose.
- J. Ensure the company providing the coating process also provides a five year coil warranty.
- K. Ensure the entire coating process is similar to the Husky Coil Coat patented process as manufactured by Bronz-Glow Technologies, Inc. (Jacksonville, FL). Other approved coatings are as manufactured by Thermoguard (Coconut Creek, FL) or Heresite (Manotowac, WI).

## 2.7 REFRIGERANT CIRCUIT

- A. Provide each circuit with a factory supplied and piped liquid line solenoid valve, replaceable core type filter dryer, liquid line sight glass and moisture indicator, thermal expansion valve sized for maximum operating pressure, compressor discharge service valve, charging valve, insulated suction line service valve, discharge line check valve, condenser pressure relief valve, charging port and an insulated suction line.

## **2.8 CONTROLS**

- A. Provide all necessary controls for fully automatic, failsafe operation of the refrigeration chiller. Obtain capacity control for the chiller by positioning the hydraulically actuated slide valves on the screw chiller in response to leaving chilled water temperature. Design unloading to modulate machine capacity to at least 10 percent of full load for an indefinite period.
- B. Mount NEMA 3R weatherproof steel control panel containing starters, power and control wiring, molded case disconnect switch, factory wired for single point power connection. Ensure control panel automatically recycles to a normal start sequence when power is interrupted. Ensure controls load and unload chiller in stages to provide 45 Degree F chilled water.
- C. For each compressor, provide across-the-line starter, non-recycling compressor overload, starter relay and control power transformer or terminal for controls power. Provide manual reset current overload protection.
- D. Provide the following safety controls with indicating lights arranged so that operating any one will shutdown machine and require manual reset:
  - 1. Low chilled water temperature switch.
  - 2. High discharge pressure switch for each compressor.
  - 3. Low suction pressure switch for each compressor.
  - 4. Oil pressure safety switch.
  - 5. Differential pressure flow switch in chilled water line.
  - 6. Relay for remote mounted emergency shutdown switch.
- E. Provide the following operating controls:
  - 1. Multi-step chilled water temperature controller to cycle compressors.
  - 2. Five minute off-timer to prevent compressor from short cycling.
  - 3. Periodic pump-out timer to pump down on chilled water flow and high evaporator refrigerant pressure.
  - 4. Load limit thermostat to limit compressor loading on high return water temperature.
  - 5. Hot gas bypass sized for minimum compressor loading on both compressors. Its function is to bypass hot refrigerant gas to evaporator.
  - 6. Under-voltage and phase protection.
- F. Provide pre-piped gauge board with pressure gauges for suction refrigerant pressures, discharge refrigerant pressures and oil pressures for each compressor.
- G. Provide micro-computer control panel to provide the following functions:
  - 1. Lead/Lag switching of compressors.
  - 2. Compressor capacity control.
  - 3. Hot gas unloading of each compressor.
  - 4. Voltmeter and ammeter gauges.

5. Number of starts and elapsed time meter.

## 2.9 HOUSING ENCLOSURE

- A. House components in welded steel frame enclosure containing galvanized steel panels with weather resistant, baked enamel finish.
- B. Mount starters and disconnects in a NEMA 3R weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.

## 2.10 VIBRATION ISOLATION

- A. Provide vibration isolation on the chiller by use of rubber-in-shear type.

## 2.11 REFRIGERANT

- A. Refrigerant: Chiller refrigerant to be R-134A, R-410A or a refrigerant that does not use CFCs or cause the project to exceed the threshold set by the formula  $LCGWP + LCODP \times 10^6 \leq 100$  for ozone depletion and global warming potential.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install chiller under provisions of the manufacturer's instructions.
- B. Provide for connection to electrical service. Include for connection of oil pump to separately fused circuit.
- C. Install electrical devices furnished by the manufacturer, but not specified to be factory mounted. Verify that the electrical wiring installation is under provisions of the manufacturer's submittal and installation requirements. Refer to Division 16.
- D. Special attention and consideration shall be provided when the chiller is to be located adjacent to residential areas. Verification shall be made that noise levels generated by this and other equipment shall not exceed 55 dBA at the property line. Should the noise levels exceed 55 dBA, the chiller shall be provided with the chiller manufacturer's sound attenuation package in addition to powder coated metal sandwich panels. The panels shall be provided with acoustical material installed between the metal sheets located on the inside face of the chiller enclosure.
- E. Chiller shall be installed within an aesthetically pleasing and sound attenuating CMU wall enclosure in lieu of using chainlink fencing. Enclosure shall be no more than two feet higher than the top of the chiller and provided with a minimum of six feet clearance around the chiller foot print or as recommended by the chiller manufacturer.
- F. Install chiller on oil-resistant neoprene isolation pad atop a reinforced concrete pad. Install plumb and level and firmly anchored maintaining manufacturer's recommended clearances.



- G. Align chiller package on concrete foundations, sole plates and sub-bases. Level grout and bolt in place.
- H. Connect the chilled water piping inlet to the evaporator with a temperature controller bulb well, temperature limit controller bulb well, shutoff valve, thermometer, strainer, flow switch bulb well, flexible pipe connector, pressure gauge and unions. Connect outlet to the evaporator with a shutoff valve, balancing cock, thermometer, flexible pipe connector, pressure gauge and union.
- I. Arrange piping for easy dismantling and clearance to permit tube cleaning and removal.
- J. Furnish field installed automatic temperature control requirements to the control installer.
- K. Provide the services of the manufacturer's technical representative to leak test, refrigerant pressure test, evacuate, dehydrate, charge, startup, calibrate controls and instruct Owner on operation and maintenance to the Owner's satisfaction. Do not operate chiller until proper water flow quantities have been attained.
- L. Demonstrate system operation and verify specified performance at the time of Beneficial Occupancy.
- M. Provide a total of seven and one-half hours of training of the Owner's maintenance personnel by the chiller manufacturer's technical representative. Provide a ten day notice to the Owner of startup/training dates.
- N. Contractor to register the new chiller with FPL under their energy incentive program.

**END OF SECTION**

## **SECTION 15768**

### **FAN COIL UNIT**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Vertical & horizontal chilled water fan coil unit.

##### **1.2 RELATED SECTIONS**

- A. Section 15055 - Motors.
- B. Section 15070 - Mechanical Sound and Vibration Control.
- C. Section 15083 - Duct Insulation.
- D. Section 15810 - Ducts.
- E. Section 15816 - Non-Metal Ducts.
- F. Division 16 - Electrical

##### **1.3 REFERENCES**

- A. ANSI/ASHRAE 90A - Energy Conservation in New Building Design.
- B. ARI 210 - Unitary Air Conditioning Equipment.
- C. NFPA 70 - National Electric Code.
- D. SMACNA - Low Pressure Duct Construction Standards.
- E. ANSI S12.60 - Acoustical Performance Criteria, Design Requirements & Guidelines for Schools.

##### **1.4 QUALITY ASSURANCE**

- A. Fan Coil Unit: Product of a manufacturer regularly engaged in production of components that issues complete catalog data on total product.

##### **1.5 SUBMITTALS**

- A. Submit product data under provisions of Section 01330, "Submittal Procedures".
- B. Submit manufacturer's installation instructions under provisions of Section 01330 - Submittal Procedures.
- C. Indicate electrical service.

##### **1.6 OPERATION AND MAINTENANCE DATA**

- A. Submit operation and maintenance data.
- B. Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data and parts listing.

##### **1.7 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.

- B. Store and protect products under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.

## **1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Do not operate unit for any purpose, temporary or permanent until filters are in place, bearings lubricated and fan has been test run under observation.

## **1.9 EXTRA STOCK**

- A. Provide one set of 2 inch deep minipleated MERV 13 filters in accordance with the latest edition of ASHRAE 52.2.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS - UNIT VENTILATOR**

- A. International Environmental.
- B. Temspec.
- C. Trane.
- D. District Approved Equal.

### **2.2 FAN COIL UNIT**

- A. Ensure the unit is a factory assembled and pre-wired, chilled water blow-thru type fan coil unit, suitable for low pressure operation and consisting of a cabinet and frame, supply fan, primary chilled water coil, motorized outdoor air damper, 4 inch depth outdoor air intake aluminum wall louver with 1/2 inch mesh birdscreen, return air grille, raised base, side chilled water pipe cover, serviceable access panels with screwdriver operated flush cam type fasteners, filters and accessories.
- B. Electric resistance heaters to consist of open wire nichrome elements with the necessary controls. Safety controls shall include primary over-temperature and over-current protection.
- C. Unit to be provided with manufacturer approved vibration isolators.
- D. The final equipment location and selection design must comply with the maximum noise criteria levels specified in Section 15070 – Mechanical Sound and Vibration Control, paragraphs 2.3(E) thru (J) for classroom and other core learning spaces.
- E. The unit shall achieve a maximum background noise level from heating, ventilating and air conditioning (HVAC) systems in classrooms and other core learning spaces of 45 dBA. Design classrooms and other core learning spaces to include sufficient sound absorptive finishes for compliance with reverberation time requirements as specified in ANSI Standard S12.60-2002, Acoustical Performance Criteria Design Requirements and Guidelines for Schools.

### **2.3 CASING**

- A. Construct casing of 14 gauge, single-wall galvanized steel on channel base. Casing to be constructed and reinforced to withstand the maximum fan pressures developed.
- B. Insulate casing sections with 1 inch thick coated anti-microbial treated glass fiber insulation.
- C. Construct drain pan from stainless steel. Pitch entire pan to drain connection.
- D. The manufacturer shall be responsible for providing additional rigid board type insulation to prevent the fan coil unit from sweating under the encountered operating conditions.

## **2.4 SUPPLY FAN**

- A. Forward curved, centrifugal type fan resiliently mounted with rubber isolated hinge mounted direct drive motor.

## **2.5 MOTORS AND DRIVES**

- A. Maximum horsepower as indicated and specified. Protect motor against contact failure, loss of any phase (single phasing), low voltage, high voltage, voltage unbalance, phase reversal and wound for specified voltage having a minimum power factor of 85 percent at 100 percent load and a minimum efficiency of 91.7 percent as per IEEE Test Procedure 112, Method B at 100 percent load.

## **2.6 EVAPORATOR COIL**

- A. Provide coil section with access to both sides of coil. Enclose coil with headers and return bends fully contained within casing. Slide coil into air handling unit casing through removable end panels with blank-off sheets and sealing collars at connection penetrations.
- B. Provide drain pan and downspouts for cooling coil banks of more than one coil high. Coils to be of sufficient free area and not incorporate moisture eliminators or coatings to prevent water carryover.
- C. Provide coils indicated for water cooling. Ensure face velocity does not exceed 500 FPM.
- D. Construct coils of 1/2 inch minimum copper tubes mechanically expanded into aluminum fins and factory pressure tested to 350 PSI.
- E. Coil to contain a minimum of six rows and a maximum of 8 to 12 Fins per Inch (FPI).

## **2.7 REFRIGERANT (Chiller)**

- A. Chiller refrigerant shall be R-410A or a refrigerant that does not use CFCs or cause the base building to exceed the threshold set by the formula  $LCGWP + LCODP \times 10^6 \leq 100$  for ozone depletion and global warming potential.

## **2.8 FILTER SECTION**

- A. Provide 2 inch depth filter section, UL Class 2, high efficiency, minimum MERV 13 disposable minipleated type air filters with an atmospheric dust

spot (ADS) efficiency of 80-85 percent. Refer to Section 15860 - Air Cleaning Devices.

## **2.9 ELECTRICAL**

- A. Disconnect Switch: Factory mount disconnect switch.

## **2.10 CONTROLS**

- A. Controls shall be a low voltage, electric solid state microcomputer based, thermostat. Should connection to the Andover Controls Energy Management/Security (EM/S) System not be possible, ensure thermostat incorporates:
  1. Preferential rate control to minimize overshoot deviation from set point.
  2. Instant override of set point for continuous or timed period from one hour to 31 days.
  3. Short cycle protection.
  4. Programming based on weekdays, Saturday and Sunday.
  5. Switch selection features including digital display, 24 hour clock, remote sensor, fan on-auto.
- B. Ensure thermostat display includes:
  1. Time of day.
  2. Actual room temperature.
  3. Programmed temperature.
  4. Programmed time.
  5. Duration of timed override.
  6. Day of week.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- A. Examine supports to receive unit and related ductwork for:
  1. Vertical mounting surface.
  2. Water tightness.
  3. Proper anchoring.
  4. Unevenness, irregularities and incorrect dimensions that would affect quality and execution of installation.
- B. Verify that proper power supply is available.
- C. Do not proceed with installation until supports conform to specifications requirements.

### **3.2 INSTALLATION**

- A. Install unit under provisions of the manufacturer's instructions.

- B. Identify unit with its tag showing the building number, unit number and area served.
- C. Verify that during construction, the unit is fitted with 2 inch depth, MERV 13 efficiency air filters.
- D. Connect chilled water piping to the unit so that it is clear of access panels, filters and motor. It's preferable that the chilled and condenser water piping be installed to the unit side to allow frontal access.
- E. Route unit condensate pipe to discharge into the site storm drain system catch basin.

### **3.3 CLEANING**

- A. Clean tar or other debris from exterior of casings.
- B. Remove debris and waste materials resulting from installation.
- C. Do not operate unit until area served has been cleaned and filters are in place.

### **3.4 TEST AND ADJUST**

- A. Start equipment in presence of the unit manufacturer representative noting any unbalance, slippage of belts, unusual or similar indication of improper operation.
- B. Prior to building commissioning (if applicable) and subsequent to test and balance, remove the filters installed during construction and replace with a new set of MERV 13 efficiency air filters.
- C. After installation, test unit to demonstrate proper operation of unit at performance requirements specified including running balance and noise considerations, proper heating and cooling air flow.
- D. Correct any deficiencies in unit operation.

**END OF SECTION**

## **SECTION 15810**

### **METAL DUCTS**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Low and medium pressure duct.
- B. Variable air volume boxes.
- C. Ventilation ductwork.
- D. Fire and smoke dampers.

##### **1.2 RELATED SECTIONS**

- A. Section 21 05 29 - Hangers and Supports.
- B. Section 21 07 13 - Duct Insulation.
- C. Section 23 73 10 - Electric Duct Heater.
- D. Section 23 37 00 - Air Outlets and Inlets.

##### **1.3 REFERENCES**

- A. ASHRAE - Fundamentals Handbook; Chapter 32 - Duct Design, Latest Edition.
- B. ASHRAE - HVAC Systems and Equipment; Chapter 16 - Duct Construction, Latest Edition.
- C. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- D. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- E. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- F. UL 181 - Factory-Made Air Ducts and Connectors.
- G. UL 555 - Fire Dampers.
- H. UL555S - Smoke Dampers.

##### **1.4 DEFINITIONS**

- A. Pressure Classifications:

1. Low Pressure/Low Velocity: Less than or equal to 2 inch water gauge (WG) positive or negative static pressure and velocities less than 2,500 FPM.
  2. Medium Pressure/High Velocity: 2 inch WG to 9 inch water gauge (WG) positive or negative static pressure and velocities greater than 2,500 FPM.
- B. Duct Sizes: Inside clear dimensions are indicated on drawings. For double wall insulated duct, free inside clear dimensions shall be maintained.
- C. Low Pressure:
1. Three Pressure Classifications:
    - (a) 1/2 inch WG positive or negative static pressure and velocities less than 2,000 FPM.
    - (b) 1 inch WG positive or negative static pressure and velocities less than 2,500 FPM.
    - (c) 2 inch WG positive or negative static pressure and velocities less than 2,500 FPM.
- D. Ductwork:
1. Designed to be designed under provisions of the requirements for the specified SMACNA duct pressure classification.
  2. Duct Pressure Classification: As required for the pressure available from the fan or a minimum of 2 inch WG, whichever is greater.
  3. Ductwork to be sealed to SMACNA Class "A" requirements including the transverse joints, fitting connections, 45 degree takeoff connections, bellmouth connections and longitudinal seams.

## 1.5 REGULATORY REQUIREMENTS

- A. Construct ductwork to ANSI/NFPA 90A and 96 standards.

## 1.6 SUBMITTALS

- A. Recycled Duct Content:
1. State the percentage of pre-consumer and post-consumer recycled content per unit of product.
  2. State the relative dollar value of the recycled content product to the total dollar value of the product included in project.
  3. If the recycled content product is part of an assembly, state the percentage of the recycled content product in the assembly by weight.
  4. If the recycled content product is part of an assembly, state the relative dollar value of the recycled content product to the total dollar value of the assembly.
- B. Submit detailed ductwork coordination plans drawn to a scale of not less than 1/4 inch = 1'-0" for general building areas and 3/8 inch = 1'-0" for mechanical rooms and similar congested areas under provisions of Section 01330, "Submittal Procedures". Provide elevation views of equipment such as air handling units, fans, hoods, etc.



- C. Shop Drawings: Submit detailed ductwork coordination plans drawn to a scale of not less than 1/4 inch = 1'-0" for general building areas, mechanical rooms and similar congested areas. Indicate duct routing, duct dimensions, elevation of ducts above finished floor, duct fittings, standard shop practices and particulars such as gauges, sizes welds and configuration prior to start of work. Submit manufacturer's data for double wall ducts indicating tested thermal and acoustical performance. Ensure acoustical data indicates attenuation in each octave band per linear foot of ductwork

**1.7 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.
- B. Store and protect products under provisions of Section 01663 - Product Delivery, Storage and Handling Requirements.

**PART 2 PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS - FIRE DAMPERS**

- A. Nailor Industries
- B. Ruskin
- C. Greenheck

**2.2 ACCEPTABLE MANUFACTURERS - SMOKE DAMPERS**

- A. Nailor Industries
- B. Ruskin
- C. Greenheck

**2.3 ACCEPTABLE MANUFACTURERS - VOLUME DAMPERS**

- A. Nailor Industries
- B. Ruskin
- C. Greenheck

**2.4 ACCEPTABLE MANUFACTURERS - BELLMOUTH TAKEOFFS W/ DAMPERS**

- A. Buckley Associates, Inc.

**2.5 ACCEPTABLE MANUFACTURERS - MOTOR ACTUATORS**

- A. Belimo Air Controls

**2.6 ACCEPTABLE MANUFACTURERS - FLEXIBLE DUCT**

- A. Omniaire
- B. Atco
- C. Thermaflex

**2.7 ACCEPTABLE MANUFACTURERS - FLEXIBLE DUCT CONNECTOR**

- A. Elgen
- B. DuroDyne
- C. Ventfabrics

**2.8 ACCEPTABLE MANUFACTURERS - ACCESS DOORS**

- A. Bilco
- B. Milcor
- C. Nystrom
- D. Ventfabrics

**2.9 MATERIALS**

- A. General: Non-combustible rigid or flexible materials conforming to requirements of ANSI/NFPA 90A for Class 1 air duct materials and UL 181.
- B. Steel Ducts: ASTM A527, galvanized steel sheet, G-90 lock-forming quality, having zinc coating of 1.25 ounce per square foot for each side in conformance with ASTM A90. The use of fiberglass duct is **PROHIBITED**.
- C. Stainless Steel Ducts: ASTM A167, Series 304 stainless steel sheet.
- D. Fasteners: Rivets, bolts or sheet metal screws. Fasteners which are visible on the diffuser or grille faces shall be furnished with the terminal device at the factory and match the finish
- E. Sealant: Non-hardening, water base, fire resistive, compatible with mating materials or liquid used with tape or heavy mastic with membrane.
- F. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end or continuously threaded.
- G. Duct Liner: Liner exposed to air stream is **PROHIBITED**. Provide double wall insulated duct containing an outer steel pressure shell, perforated steel inner liner, 1 inch fiberglass insulation sandwiched between the inner liner and outer shell and encapsulated in Mylar for the first 20 feet of both the supply and return air ductwork.

## 2.10 LOW PRESSURE/LOW VELOCITY DUCT

- A. Construct all sheet metal ductwork from galvanized sheet steel conforming to requirements of the latest edition of ASHRAE HVAC Systems and Equipment Handbook, Chapter 16, Duct Construction. Fabricate and support under provisions of SMACNA Low Pressure Duct Construction Standards and ASHRAE Handbooks except as indicated. Provide duct, gauges, reinforcing, sealing, etc. for 2 inch WG positive or negative static pressure. **Low pressure ductwork shall be rectangular, flat oval or round.**
- B. Ensure all rectangular ductwork is fabricated with Pittsburgh lock seam construction. Snaplock seam construction of any variety for rectangular duct is **PROHIBITED**. All rectangular ducts provided with snaplock seam construction shall be replaced at no cost to the Owner and without any time extension to the Contractor. All joints and seams must be sealed with mastic.
- C. Intake Air Plenum: Constructed of galvanized steel with the bottom of the plenum sloping 15 degree toward the louver. Bottom of the plenum to be attached to the top of the bottom blade of the louver.
- D. Exposed Ductwork: Ductwork exposed to the elements shall be fabricated from minimum 18 gauge galvanized sheet steel, insulated and weatherproof so that the insulation does not get wet.
- E. Construct tee's, bends and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular or miter elbows are used, provide single thickness air foil turning vanes. The use of double wall air foil turning vanes shall be approved if there is no increase in cost.
- F. Increase duct sizes gradually, not exceeding 22.5 degree air divergence wherever possible. Ensure air divergence upstream of equipment does not exceed 30 degree. Ensure convergence downstream of equipment does not exceed 45 degree.
- G. Construct all branch takeoffs from both the supply and return mains and sub-mains with 45 degree branch takeoff fittings equipped with volume control dampers. Should 45 degree branch takeoffs not be appropriate, two-piece bellmouth or conical takeoffs with volume control dampers will be acceptable.
- H. Connect flexible ducts to metal ducts with adhesive, draw-band and foil faced duct tape.
- I. Seal all transverse joints, longitudinal seams and duct wall penetrations.
- J. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
- K. Use crimp joints with bead for joining round duct. Crimp in direction of air flow.

- L. Use double nuts and lock washers on threaded rod supports.

## 2.11 MEDIUM PRESSURE/HIGH VELOCITY DUCT

- A. Construct all sheet metal ductwork from galvanized sheet steel conforming to requirements of the latest edition of ASHRAE HVAC Systems and Equipment Handbook, Chapter 16, Duct Construction. Fabricate and support in accordance with SMACNA High Pressure Duct Construction Standards recommended fabrication and installation tables and procedures. Provide duct, gauges, reinforcing, sealing, etc. **Medium pressure ductwork shall be flat oval or round in lieu of rectangular.**
- B. Ensure single wall and double wall flat oval or round ducts are fabricated with spiral lock seam construction. Snaplock seam construction of any variety is **PROHIBITED**. Fittings are to be spot welded construction and fabricated by the same manufacturer as the ductwork. All joints and seams must be sealed with mastic.
- C. Construct tee's, bends and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular or miter elbows are used, provide single thickness air foil turning vanes. The use of double wall air foil turning vanes shall be approved if there is no increase in cost.
- D. Increase duct sizes gradually, not exceeding 15 degree divergence wherever possible. Ensure divergence upstream of equipment does not exceed 30 degree. Ensure convergence downstream of equipment does not exceed 45 degree.
- E. Construct all branch takeoffs from both the supply and return mains and submains with 45 degree branch takeoff fittings. Should 45 degree branch takeoffs not be appropriate, two-piece bellmouth or conical takeoffs will be acceptable.
- F. Volume dampers shall not be provided on medium pressure ductwork containing VAV air terminal units.
- G. Seal all transverse joints, longitudinal seams and duct wall penetrations to SMACNA Class "A" requirements.
- H. Provide easements where medium/high pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
- I. Use double nuts and lock washers on threaded rod supports.

## 2.12 DOUBLE WALL RECTANGULAR DUCT

- A. Rectangular double wall insulated duct and fittings containing a solid steel pressure shell, perforated steel inner liner and a 1 inch fiberglass insulation sandwiched between the inner liner and outer shell.

- B. 'K' value of 0.27 at 75 Degree F.
- C. Encapsulate the insulation with 0.002 inch thick mylar sleeve between the inner liner and the insulation to seal the porous insulation from the air stream.
- D. Where double wall insulated duct connects to a single wall duct, provide a double wall-to-single wall insulated end fitting.
- E. At the electric duct heater, provide a solid inner liner beginning 6 inches upstream and ending 6 inches downstream of the electric duct heater.

### **2.13 DOUBLE WALL FLAT OVAL/ROUND DUCT**

- A. UL 181, flat oval/round double wall insulated duct and fittings containing a solid steel pressure shell, perforated steel inner liner and a 1 inch fiberglass insulation sandwiched between the inner liner and outer shell; Acousti-k27 as manufactured by United McGill or approved equal.
- B. 'K' value of 0.27 at 75 Degree F.
- C. Encapsulate the insulation with 0.002 inch thick mylar sleeve between the inner liner and the insulation to seal the porous insulation from the air stream.
- D. Where double wall insulated duct connects to a single wall duct, provide a double wall-to-single wall insulated end fitting.
- E. At the electric duct heater, provide a solid inner liner beginning 6 inches upstream and ending 6 inches downstream of the electric duct heater.

### **2.14 FLEXIBLE AIR DUCT**

- A. UL 181, Class 1 commercial grade flexible duct rated for 10 inch WG having a minimum R-6 rating and constructed of a vinyl interior liner supported by helically wound spring steel wire with flexible high density glass fiber insulation and enclosed with a metalized spiral reinforced vapor barrier jacket; Model 1200 manufactured by Omniair, Model UPC #016 manufactured by Atco, Series MKE manufactured by Thermaflex or approved equal. Hard duct drops will not be approved unless waived by the Owner prior to design.
- B. Provide flexible duct in one-piece, 2 feet minimum and not to exceed 8 linear feet. Spliced flexible duct is **PROHIBITED**.
- C. Flexible air duct shall be installed on low pressure ductwork only.

### **2.15 KITCHEN HOOD EXHAUST DUCT**

- A. Fabricate and support under provisions of NFPA 96.
- B. Construct ductwork from 18 gauge Type 304 stainless steel using continuous external welded joints and seams.

## **2.16 SHOWER/LOCKER ROOM EXHAUST DUCT**

- A. Fabricate and support under the provisions of the latest edition of the Industrial Ventilation Manual.
- B. Construct ductwork from 20 gauge aluminum with watertight snaplock seams and silicone sealed joints.

## **2.17 FLAMMABLE STORAGE & EQUIPMENT STORAGE ROOM DUCTS**

- A. Fabricate and support under provisions of the latest edition of the SMACNA Low Pressure Duct Construction Standards and ASHRAE HVAC Systems and Equipment Handbook, Chapter 16, Duct Construction.
- B. Construct ductwork from galvanized sheet steel. Provide duct, gauges, reinforcing, sealing, etc. for 2 inch WG positive or negative static pressure.

## **2.18 CLOTHES DRYER EXHAUST DUCT**

- A. Construct ductwork from minimum 26 gauge galvanized sheet steel with smooth interior surface. Provide duct with wall cap, backdraft damper, reinforcing, sealing, etc. Joints shall run in the direction of airflow and not contain sheet metal screws or other fasteners in the air stream.
- B. The maximum length of duct shall not exceed 25 feet.

## **2.19 TURNING VANE**

- A. Single thickness, galvanized steel type air foil turning vanes for sizes up to 24 inches in depth and cataloged by a recognized air distribution equipment manufacturer. Provide double thickness air foil turning vanes for sizes greater than 24 inches in depth or in all instances where there is no increase in cost over the single thickness air foil turning vanes. Provide at all 90 degree square elbows.

## **2.20 FIRE DAMPER**

- A. UL 555, dynamic curtain type, 165 Degree F fusible link fire damper with 22 gauge galvanized steel channel frame, 22 gauge galvanized steel blades, S-slip joint breakaway connection (furnished by Contractor), UL test label with a 1-1/2 hour fire protection rating for penetrations in 1 hour and 2 hour rated partitions and a 3 hour fire protection rating for penetrations in a 3 hour rated partition. Model D0120 as manufactured by Nailor, Model DIBD2 as manufactured by Ruskin for 1 and 2 hour fire protection rating or approved equal. Model D0520 as manufactured by Nailor, Model DIBD23 as manufactured by Ruskin for 3 hour fire protection rating or approved equal.

- B. Electrical installation shall be performed by the fire alarm specialist and shall comply with Division 16.

## **2.21 SMOKE DAMPER**

- A. UL 555S, Class II leakage smoke damper with 16 gauge galvanized steel hat channel frame with mitered corners reinforced and strengthened with die formed corner gussets, 14 gauge galvanized steel double skin opposed blades, concealed linkage, 1/2 inch plated steel hex axles double thru-bolted at each end of blade to provide positive locking connection, stainless steel sleeve bearings, factory mounted UL approved electric actuator, S-slip joint breakaway connection (furnished by Contractor), UL test label with a 1-1/2 hour fire protection rating for penetrations in 1 hour and 2 hour rated partitions, and a 3 hour fire protection rating for penetrations in a 3 hour rated partition, Model 1210 as manufactured by Nailor, Model SD36 as manufactured by Ruskin or approved equal.
- B. Electrical installation shall be performed by the fire alarm specialist and shall comply with Division 16.

## **2.22 OUTSIDE AIR MAKEUP MOTORIZED CONTROL DAMPER**

- A. Low leakage extruded 6063T5 aluminum hat channel frames with mitered corners and die formed internal braces for rigidity and structural strength; 6 inch depth airfoil type extruded aluminum opposed blades with integral full length structural, reinforcing tubes; blade edge and jam seals of extruded vinyl double edge design; locking quadrant and molded synthetic bearings; 1/2 inch stainless steel hex axles secured tight to airfoil blade; 6 inch x 1/2 inch diameter galvanized steel control shaft with outboard support bearings and actuator linkage concealed in frame. Dampers capable of moving freely through a full 90 degree arc. Model CD-50 as manufactured by Ruskin or approved equal.
- B. Opposed blade type dampers are to be provided when duct dimensions are greater than 12 inches in depth. Parallel blade type dampers may be provided when duct dimensions are no greater than 48 inches wide x 12 inches depth.
- C. Maximum leakage rates shall not exceed the values when tested at 1 inch WG pressure differential in accordance with AMCA Publication 500.
- D. Motor actuator shall be 24 Volt spring return to close, heavy duty, direct coupled electric motor actuator with minimum 75 Inch Lb. of torque, visual position indicator, mounted outside of duct. Actuator to be as manufactured by Belimo, Model LF-24. Refer to Specification Section 15900 - HVAC Instrumentation and Controls.

## **2.23 DUCT SMOKE DETECTORS**

- A. Refer to Section 13845 - Fire Alarm System.

## **2.24 MANUAL VOLUME CONTROL DAMPER**

- A. 16 gauge galvanized steel channel frames, 5 inch wide x 16 gauge galvanized steel blades with molded synthetic bearings, 1/2 inch stainless steel hex axles double thru-bolted at each end of blade, 2 inch high standoff brackets on quadrants for insulated duct. Dampers capable of moving freely through a full 90 degree arc. Model 1820 as manufactured by Nailor, Model MD-35 as manufactured by Ruskin or approved equal.
- B. Opposed blade type dampers are to be provided when duct dimensions are greater than 12 inches in depth. Parallel blade type dampers may be provided when duct dimensions are no greater than 48 inches wide x 12 inches depth.

## **2.25 ACCESS DOOR (DUCT MOUNTED)**

- A. Minimum 18 inch x 18 inch or maximum size permitted, square gasketed panels of 18 gauge galvanized steel at all locations requiring access to control devices and upstream of coil, electric duct heaters, smoke detectors, motor operated dampers, filters and at a distance of 25 feet from the AHU discharge on both the supply and return air ductwork.
- B. Access door shall be hinged with cam latches and fully gasketed to the perimeter.

## **2.26 FLEXIBLE DUCT CONNECTOR**

- A. 22 ounce neoprene coated fiberglass fabric connectors with a minimum tear and tensile strength of 110 Lbs. and 250 Lbs, respectfully. Provide in 6 inch minimum to 10 inch maximum lengths at all duct connections to rotating or vibrating equipment such as air handler units, unit ventilators, etc. Model "Silent Duct" manufactured by Elgen Manufacturing Corporation.

## **2.27 DUCT HANGER STRAPS**

- A. 1" x 18 gauge galvanized steel fastened with screws to rectangular ducts and with a bolt for round ducts.
- B. Stainless steel suspension cable with ratchet as manufactured by Gripple or approved equal.

## **2.28 HANGERS AND SUPPORTS**

- A. Concrete inserts or structural steel fasteners appropriate for construction materials to which hangers are being attached to. Powder-actuated stud fasteners are **PROHIBITED**.

## **2.29 LOUVERS (EXTERIOR WALL)**

- A. Refer to Section 10200 - Louvers and Vents.



## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install insulation under provisions of the manufacturer's instructions and with a minimum number of joints.
- B. Install ducts vertically, horizontally, parallel and perpendicular to the building lines.
- C. The duct smoke detector sampling tube shall extend all the way across the duct and out the opposite side of the duct. The ends shall be capped and the annular space filled with a listed duct sealant.
- D. The duct smoke detector housing shall be marked with the AHU that it serves along with the device number and whether it is for the supply or return air duct.
- E. Provide duct access doors for inspection of the duct smoke detectors.
- F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- G. Set plenum doors 6 inches to 12 inches above floor or side of duct. Arrange door swing so that fan static pressure holds door in a closed position.
- H. Locate ducts with sufficient space around the air handler unit to allow normal operating and maintenance activities.
- I. The supply and return air ducts shall be provided with 45 degree shoetap takeoffs and volume dampers. Should the 45 degree shoetaps not be appropriate such as for rectangular ducts, two-piece round bellmouth spinin takeoffs such as manufactured by Buckley or two-piece-piece conical takeoffs provided with volume dampers will be acceptable. **THE USE OF ANY 90 DEGREE BRANCH SPININ TAKEOFF SHALL NOT BE APPROVED.**
- J. Supply and return air duct branches or sub-branches shall be provided with volume dampers for balancing purposes. The air outlets or inlets **SHALL NOT CONTAIN REGISTERS.** Registers are subject to tweaking by unauthorized individuals which will result in unbalancing of the air side system. **THE USE OF ANY AIR TURNING DAMPER OR EXTRACTOR SHALL NOT BE APPROVED.**
- K. Connect supply air diffusers and return air grilles to low pressure ducts with 8 feet maximum length of flexible air duct. Should the duct length from the duct

takeoff to the supply air diffuser or return air grille exceed 8 feet in length, the difference in length shall be provided with the use of rigid duct of an equivalent cross sectional area.

- L. Install flexible air duct on the low pressure ductwork without sharp bends. Minimum centerline radius to be not less than the duct diameter as recommended by SMACNA. Replace crushed or deformed flexible air ducts. Secure ducts with drawbands, foil faced silver tape and mastic at takeoffs, supply air diffusers and return air grilles.
- M. During construction, provide temporary closures on all open ductwork by sealing with a disposable polyethylene sheet to prevent construction dust from entering ductwork system.
- N. Provide residue traps at the base of all vertical risers of the kitchen hood exhaust ductwork and provide access doors for cleaning. All horizontal ducts shall be installed without forming dips or traps that might collect grease residue.
- O. On galvanized sheet steel supply and return air ductwork, provide double wall insulated duct for sound attenuation and for exterior installations outside the building envelope where a temperature difference of 30 Degree F or more exists. For sound attenuation, provide the following lengths of double wall insulated duct on both the supply and return duct from the inlet and discharge of air handling units:
  - 1. Constant Air Volume (Single Zone): 20 feet on both the supply and return air ductwork from the AHU.
  - 2. Variable Air Volume: 20 feet on both the supply and return air ductwork.
  - 3. If branch ductwork is required within the 20 feet of double wall insulated duct main, provide double wall insulated branch ducts to obtain the minimum lengths of double wall insulated duct.
- P. Unless guards are provided with wall exhaust fans, enclose each belt drive fan in a diamond mesh screen fastened to an approved steel frame and secured to the equipment. The guard shall be fastened with easily removable screws. Provide a hole in the guard to permit the taking of tachometer readings of the driven equipment.
- Q. Do not install ductwork inside buildings until the building is weather-tight. Replace weather damaged ductwork at no cost to the Owner without any time extension to the Contractor.
- R. Perform duct leakage test on medium pressure ductwork only prior to equipment startup. Duct leakage not to exceed 2 percent of the total CFM at 1-1/2 times the design external static pressure.
- S. Insulation is to be attached to the ductwork with the use of 12 gauge galvanized steel impale type anchor pins adhered to the duct with mastic sealant. The use of self-adhesive type anchor pins is **PROHIBITED**.

- T. Insulate all ductwork in mechanical rooms including the face and bypass duct (if applicable) with externally applied rigid board insulation with the exception of the first 20 feet of both the supply and return air ductwork from the AHU where double wall insulated duct is provided. Flex connectors shall be insulated with blanket insulation.
- U. Provide all necessary structural steel hangers, sheet metal flanges and reinforcements required to install the electric duct heater and other equipment in the duct system.
- V. Use a fire resistant mastic sealant to seal all joints and seams of metal duct unless they are continuous welded. Apply mastic sealant to transverse joints and longitudinal seams.
- W. Do not support ductwork from joist cross and lateral bracing or from galvanized steel decking. Should the deck be constructed of concrete, support from the concrete deck will be permitted with the use of concrete anchor fasteners after the concrete is placed and completely cured. Powder-actuated stud fasteners are **PROHIBITED**.
- X. On constant air volume system designs, provide a motor-operated, low leakage outside air makeup damper and a manual control volume damper on the outside air makeup duct connected to the mechanical room air handling unit. See the mechanical plans for the approximate location of the dampers. Electrical connection to be performed by electrician. Refer to Division 16.
- Y. On variable air volume system designs, provide a motor-operated, low leakage outside air makeup damper, a manual control volume damper and an inline fan on the outside air makeup duct connected to the mechanical room air handling unit in order to provide the minimum ventilation rate. See the mechanical plans for the approximate location of the dampers and fan. Electrical connection to be performed by electrician. Refer to Division 16.
- Z. Install fire or smoke dampers in accordance with code. Dampers shall be of the dynamic type (static dampers are not approved), self-supporting and designed to provide a positive barrier to air passage when in a closed position. Dampers to be provided by the sheetmetal contractor and shall be of the S-slip joint breakaway type connection. Secure all dampers with retaining angles fastened to the sleeve in the wall or floor penetration. Electrical connections to be performed by the fire alarm specialist. Refer to Division 16.
- AA. The wall opening for a duct penetration through a fire rated wall where a fire damper is not required shall be provided with a 12 inch long x 0.06 Inch thick steel sleeve. The sleeve shall be secured on both sides of the wall with steel retaining angles and the annular space between the sleeve and the wall opening filled with mineral wool. See FBC - Mechanical, Chapter 6, Section 607.5.3 for the other five exceptions for not using fire dampers. Electrical connections to be performed by the fire alarm specialist. Refer to Division 16.

- BB. Wall or floor penetrations for fire or smoke dampers shall not be more than 1/8 inch per foot larger on each side of the sleeve penetrating the opening.
- CC. Where ductwork penetrates a rated wall, seal airtight the annular space between the duct and the wall opening by filling it with stuffing insulation. In addition, seal airtight the perimeter of the smoke damper with a UL approved sealant such as Dow-Corning 999, Dow-Corning Silastic 732 RTV or GE RTV 108.
- DD. After completion of the fire or the smoke damper installation, remove the screws provided on the S-slip joint duct breakaway connection used during installation.

**3.2 ADJUSTING AND CLEANING**

- A. Protect AHU equipment which may be harmed by excessive dirt with temporary 4 inch depth, 80-85 percent ADS, MERV 13 disposable filters during cleaning. Refer to Section 15860 - Air Cleaning Devices.
- B. Provide adequate access into ductwork for cleaning purposes.

**3.3 DUCTWORK SCHEDULE**

<u><b>Air System</b></u>	<u><b>Ductwork Material</b></u>
Low Pressure Supply	Galvanized Steel
Medium Pressure Supply	Galvanized Steel
Return and Relief	Galvanized Steel
Outside Air Intake	Galvanized Steel
General Exhaust	Galvanized Steel
Kitchen Hood Exhaust	Stainless Steel
Dishwasher Exhaust	Stainless Steel
Organic/Inorganic Storage Room Exhaust	Stainless Steel

**END OF SECTION**

# SECTION 15940

## SEQUENCE OF OPERATION

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. HVAC units and fans.

#### 1.2 RELATED SECTIONS

- A. Section 15720 - Air Handling Unit.
- B. Section 15830 - Fans.
- C. Section 15845 - Air Terminal Units.
- D. Section 15900 - HVAC Instrumentation and Controls.
- E. Division 16 - Electrical.

#### 1.3 SYSTEM DESCRIPTION

- A. This Section defines the manner and method by which HVAC equipment functions. Requirements for each type of control system operation are specified. Refer to the controls indicated on the drawings for additional information.

#### 1.4 SUBMITTALS

- A. Submit sequence of operation under provisions of Section 01330 - Submittal Procedures.

### PART 2 EXECUTION

#### 2.1 INSTALLATION

- A. Install all controls to achieve the specified sequence of operation.
- B. Occupied cooling thermostat setting is to be 75 Degree F. Occupied heating thermostat setting is to be 68 Degree F.
- C. Identify each control device or manual switch with a permanent, engraved, laminated plastic nameplate with maximum 1/4 inch high white characters on a black background. Affix nameplates with a silicone adhesive similar to DOW RTV.
- D. Permanently mark control devices with multiple settings or positions and not identified by the equipment manufacturer with engraved nameplates in an identical manner to indicate the positions or settings.

#### 2.2 AIR-COOLED CHILLER SYSTEM

- A. The chiller is to be started and stopped by the City approved Energy Management/Security (EM/S) system. For additional information concerning the EM/S equipment interface and the automatic temperature control (ATC), contact the City of Tampa Department representative at (813) XXX-XXXX.

- B. The chiller is to start in the following sequence:
  - 1. Lead Chilled Water Pump: Lead chilled water pump to start.
  - 2. Air Handling Unit: Air handling unit to start.
  - 3. Chiller: Chiller to start once the chilled water flow is proven by flow switches.
- C. Automatically alternate service between the chilled water pumps. Ensure each pump is capable of delivering 100 percent of design flow. Coordinate this work under the provisions of the pump manufacturer and applicable sections of Divisions 15 and 16. Chiller performance will be controlled by adjustable set point temperature sensors in the primary chilled water piping to maintain a uniform chilled water temperature of 45 Degree F.

### **2.3 AIR HANDLING UNIT (Constant Air Volume)**

- A. The air handling unit is to be started and stopped by a zone on the Central Control Panel. The time schedule for enabling the system to start in the morning and shutdown in the evening will be controlled by the City approved Energy Management/Security (EM/S) system.
- B. In the cooling mode when the building is occupied, the supply fan will run continuously and the low leakage, motor-operated outside air damper will be opened to the minimum setting to provide makeup air to replace air exhausted by the exhaust fans and to ensure positive pressure within the zone or space served. During the unoccupied period, ensure the low leakage, motor-operated outside air damper fully closes and the supply fan will continue to run in a re-circulation mode until it is shutdown by the EM/S system at a pre-selected time. When operating during the unoccupied period and with the exception of the custodian room exhaust fan, ensure all other exhaust fans are commanded off so as not to cause the interior space to become negatively pressurized with respect to the outdoors.
- C. In the heating mode when the building is occupied, ensure the supply fan runs continuously and the low leakage, motor-operated outside air damper will be in the minimum setting to provide makeup air to replace air exhausted by the exhaust fans and to ensure positive pressure within the zone or space served. Provide the electric resistance heaters with a minimum of 5 KW stages of control. During the unoccupied period, ensure the low leakage, motor-operated outside air damper fully closes and the supply fan will continue to run in a re-circulation mode until it is shutdown by the EM/S system.
- D. Provide the electric resistance heaters with a high limit temperature switch and an air flow safety switch to prevent operation when the evaporator air is not operating.
- E. The pressure independent characteristic chilled water valve (PICCV) will be open to full flow whenever cooling is called for and fully closed when the face and bypass dampers are in the full coil bypass mode (face damper is closed).
- F. A return air duct mounted temperature sensor will maintain the space cooling set point by modulating the face and bypass dampers. When the temperature falls below the cooling set point and the face and bypass damper is in the full bypass mode, the duct heater will be energized to satisfy the space heating requirements.
- G. Smoke detectors located upstream of the duct heater on the supply air duct of each air handling unit will signal the building fire alarm system upon sensing products of combustion. All of the air handling units shall shutdown upon activation of any station of the fire alarm system and shall be provided with a time delay relay to allow startup after all smoke damper have reopened. Provide the smoke detectors and the interlock/shutdown electrical wiring under provisions of Division 16.

- H. Should the facility be provided with an Enhanced Hurricane Protection Area (EHPA), provision will be made to shutdown the respective air handling units and fully close the low leakage, motor-operated outside air dampers when the emergency generator ventilation system is energized in those areas designated as EHPA during hurricane periods.

**2.4 (Non-Classroom Areas Such As Gymnasium, Auditorium, Etc.)**

- A. General exhaust fan will be started and stopped by a single zone switch on the Central H.O.A. Control Panel already dedicated to close the outside air damper of the air handling unit serving that zone.

**2.5 ROOF EXHAUSTER  
(Flammable Storage & Science Organic/Inorganic Storage Rooms)**

- A. Explosion-proof upblast exhaust fan operates continuously. Provide an audible/visual alarm on the Central H.O.A. Control Panel activated by a pressure differential switch in the exhaust ductwork to indicate fan failure.

**2.6 ROOF EXHAUSTER  
(Science Classroom & Prep Area Purge Fan)**

- A. Explosion-proof upblast exhaust fan will be manually started and stopped by an ON/OFF wall mounted switch located behind the Teacher's demo table. Provide an engraved sign by the switch stating "**OPERATE PURGE FAN WITH DOOR OPEN**". Provide an audible/visual alarm on the Central H.O.A. Control Panel activated by a pressure differential switch in the exhaust ductwork to indicate fan failure.
- B. Purge fans are to be installed only in science classrooms containing fume hoods.

**2.7 CEILING EXHAUST FAN  
(Toilets)**

- A. Toilet exhaust fan will be started and stopped by a single zone switch on the Central H.O.A. Control Panel already dedicated to close the outside air damper of the air handling unit serving that zone.

**2.8 CEILING EXHAUST FAN  
(Custodian Room)**

- A. Custodian room exhaust fan shall be electrically interlocked to the air handler unit dedicated with that zone.

**2.9 DISPLAY OF SEQUENCE OF OPERATION**

- A. Submit for approval after installation and demonstrations are complete, a simplified sequence of operation geared to a non-technical individual of high school education explaining system operation and corresponding to actual devices. Upon approval by Owner, mount one copy of Sequence of Operation behind plexiglass or lexan adjacent to the primary control panel location.

**END OF SECTION**

## SECTION 15995

### STARTUP & CERTIFICATION OF AIR, WATER & CONTROL SYSTEMS

#### GENERAL

##### SECTION INCLUDES

- A. Preparation of startup certification report.
- B. Verification, measurement and setting of all water and pump flows.
- C. Verification, measurement and balancing of all air flow devices.
- D. Verification of proper performance of all controls.
- E. Sound measurement of equipment during operation, where specified.
- F. Verification of vibration limits where specified.
- G. Submittal of Contractor's certification forms.

##### GENERAL REQUIREMENTS

- H. Certification and Substantial Completion Inspection Report
  1. The Contractor shall be responsible to provide a complete test and balance report verifying, measuring and balancing all air and water flow devices.
  2. Contractor Work Required: Submit signed certification report. Facilitate and cooperate with Owner's verification of certification reports. Adjust and correct systems as required based upon Owner's verification of certification report and submit revised report reflecting system adjustments, corrections and compliance with required performance. Operate all system components during Owner's substantial completion inspection. **Ensure Substantial Completion does not occur until 30 days after approval of certification.**
  3. The Project Consultant is to make the final determination that all systems have been balanced to produce the desired results. Additional work requested will be at no additional expense to the Owner and may be requested any time until final acceptance of the building by written notice to the Contractor by the Owner or Project Consultant.
  4. The Contractor is to be financially responsible for direct time and material expenses incurred by the Owner after initial Test and Balance if total flows of all air and water systems have not been adjusted to within **plus 10 percent to minus 5 percent** of design values as certified. It is the Contractor's responsibility to correct or identify all problems with systems prior to final startup. Document design or equipment problems which prevent proper system performance to the Project Consultant 30 days prior to final startup and certification.

##### VERIFICATION BY OWNER

- I. Upon receipt of the Certification Report signed by the Contractor, the Owner will engage an independent Test & Balance Consultant to verify the information contained therein. The Contractor will be present during the verification of the data contained in the Certification Report to provide proper operation and sequencing of the system.



- J. The Owner's independent Test and Balance Consultant will conduct tests as required to verify up to, but not necessarily, 100 percent of the data contained in the Contractor's certification report. The Owner's Test and Balance Consultant may perform additional testing and balancing to further improve system efficiency and performance. Any subsequent balancing and adjusting of systems by the Owner's Test and Balance Consultant will not mitigate the Contractor's ultimate responsibility for system performance or systems and equipment warranties as defined by the Contractor's contract with the School Board of Broward County.
- K. The Owner will notify the Contractor of system construction, performance and operational deficiencies which will require immediate correction by the Contractor.

### **DEFINITIONS**

- L. Adjust: To regulate the specified fluid rate and air patterns at the terminal equipment (e.g. reduce fan speed, throttling).
- M. Balance: To proportion flows within the distribution system (mains, sub-mains, branches and terminals) under provisions with specified design quantities.
- N. Building Project: The general construction project under which the mechanical systems requiring these Testing and Balancing services were installed.
- O. Certification: A legal document consisting of a letter from the Contractor.
- P. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.
- Q. Report Forms: Test Data Sheets arranged for collection of test data in logical order for submission and review. Data should also form the permanent record which is used as the basis for any future testing, adjusting and balancing required.
- R. Startup: Testing and balancing as required to place all total air and water systems and controls in operation and operating within plus 10 percent to minus 5 percent of design values and verification of control operation within manufacturers tolerances.

### **QUALITY ASSURANCE**

- S. Test and Balancing (TAB) Certification: Test and Balance Contractors shall be certified either by the National Environmental Balancing Bureau (NEBB) or the Associated Air Balance Council (AABC) or be an independent Contractor having a minimum of five years experience. In the case of the independent Contractor, the TAB reports shall be signed and sealed by an accredited State of Florida registered professional engineer.

### **SUBMITTALS**

- T. Submit startup and certification data with certification letter.
- U. Identify Project, Project Phase, Project Location and subcontractor as applicable.
- V. Startup Certification Report:
  1. Provide five copies, each bound in separate soft cover, letter size, bound complete with index page and indexing tables with cover identification at front and at binding edge.
  2. Include signed startup certification letter from Contractor, from the manufacturer of each major piece of refrigeration or heating equipment, water treatment supplier and from temperature control manufacturer.
  3. Include all complete report forms signed by Contractor.

4. Identify items not conforming to the Contract Documents and any mal-operation or design deficiency, previously reported and unresolved.
5. Provide startup certification that all systems and components meet or exceed required operational and performance except for deficiencies noted as required above.
6. Provide 8 inch x 11 inch schematics accurately recording locations of all numbered, measured and adjusted system components with room numbers.
7. Certify that all access panels or removable ceilings have been installed for proper access for test and balance and maintenance of equipment, balancing valves, dampers, motors and controls and that they have been labeled.

#### **REPORT FORMS**

W. Submitted reports shall be as stated below, but not limited to the following information:

1. Title Page:
  - (a) Contractor Name, Contact Person
  - (b) Contractor Address
  - (c) Contractor Telephone Number
  - (d) Project Name
  - (e) Project Address
  - (f) Project Architect
  - (g) Project Engineer
2. Report Forms:
  - (a) Certification Letter
  - (b) Air Moving Equipment Test Sheet
  - (c) Fan and Motor Pulley
  - (d) Static Pressure
  - (e) Return Air/Outside Air Data
  - (f) Duct Traverse Readings
  - (g) Duct Traverse Zone Totals
  - (h) Air Distribution Test Sheet
  - (i) Exhaust Fan Data Sheet
  - (j) Electric Duct Heater
  - (k) Terminal Units
  - (l) Duct Leak Test
  - (m) Chillers
  - (n) Cooling Tower
  - (o) Pump Data Sheet
  - (p) Air Cooled Condenser

- (q) Flow Measuring Station
- (r) Cooling Coil Data
- (s) Heating Coil Data
- (t) Sound Level Report
- (u) Octave Band Chart
- (v) Vibration Test Data (Air Handling Unit)
- (w) Vibration Test Data (Rooftop Unit)
- (x) Vibration Test Data (Centrifugal Fan)
- (y) Vibration Test Data (Inline Fan)
- (z) Vibration Test Data (Utility Fan)
- (aa)Vibration Test Data (Vaneaxial Fan)
- (bb)Vibration Test Data (End Suction Pump)
- (cc)Vibration Test Data (Horizontal Split Case Pump)
- (dd)Smoke Detector Test Sheet

## **PRODUCTS**

**## NOT USED ##**

## **EXECUTION**

### **EXAMINATION**

- X. Before presenting certification to Owner, verify that systems are complete and operable. Ensure the following:
  - 1. Equipment is operable and in a safe and normal condition.
  - 2. Temperature control systems are installed complete and operable.
  - 3. Proper thermal overload protection is in place for electrical equipment.
  - 4. Final filters have been replaced, properly installed and free of air bypass.
  - 5. Medium pressure ductwork has been leak tested and accepted.
  - 6. Ductwork specialties are in their normal operating positions.
  - 7. Duct systems are clean of debris.
  - 8. All rotating equipment such as fans, are operating at the specified RPM and have the proper alignment, clearances, noise and vibration levels. All are rotating in correct direction.
    - (a) All belts are installed with proper quantity, strength and size and are set for proper tension.
    - (b) Belt size is such that all adjustable motor mounts are in mid-position at final balance point.
    - (c) Sheaves are aligned...from motor shaft to driven shaft...within 1/16 inch of true centers.
    - (d) Motor sheaves are installed as close to motor as feasible for installation.

9. Fire, smoke and volume dampers are in place and open.
10. Coil fins have been cleaned and combed.
11. Access doors are closed and duct end caps are in place.
12. Air outlets are installed and connected.
13. Duct system leakage has been minimized.
14. Hydronic systems have been flushed, filled and vented.
15. Service valves are open and balance valves are set.
16. All motor amperages at final flow are at or below nameplate rating of full load at applied voltage.
17. Strainers baskets have been removed, cleaned and replaced and that the temporary construction strainers have been removed.
18. Compression or expansion tanks have been inspected and are not air-bound or water-logged and are pre-charged. Also inspect that hydronic system is not air-bound and completely vented and filled with water.
19. Vents at coils and high points of piping systems have been installed, inspected and operating freely.
20. Automatic valves, manual valves and balancing valves have been placed in a fixed open position for full flow through all devices.
21. Linkages between valves and their actuators are secure, non-overloading and non-binding.
22. Pressures for hydronic reducing valves have been set.
23. Operating temperatures have been set for chillers, regulating valves, etc.
24. Pumps are operating at the specified horsepower and correct rotation.
25. Piping has been pressure tested and accepted; cleaned, flushed sterilized and refilled with chemicals and prescribed treated water and vented.
26. Operating safeties such as thermal overloads, firestat/freezestats, smoke detectors, relief valves, etc. are installed and fully functional.
27. Completion of the pre-balance report verifying that the Andover Energy Management/Security (EM/S) system installation is complete.
28. All equipment has been lubricated and can be operated without damage.
29. Systems are complete and operational.

(a)

- Y. Provide capped test openings for test equipment such as pitot tubes, etc. Locate test openings in each main supply duct downstream of the straight run of main duct before the first takeoff and at other locations. Openings to be sealed with replaceable plastic plugs accessible through the exterior duct insulation.

#### **AIR SYSTEM PROCEDURES**

- Z. Adjustments: Adjust all air handling systems to provide the required design air quantity to or through each component to **plus 10 or minus 5 percent**.
1. Total air streams have been set with fan speed only. Ensure all total main stream dampers are wide open at final condition; i.e. inlet vane dampers, smoke/fire
  2. dampers, main duct volume damper and at least one branch volume damper.

3. Whenever VAV systems are provided, ensure final air pressure is no more than 0.3 inch W.G. in excess of that required to drive system at full flow. With system in simulated full flow condition, ensure VAV's are closed back until total flow rate just starts to drop below design levels. Increase the pressure at that point by 0.3 Inch W.G. by fan speed adjustment only after full flow has been established for each component of each system.
- AA. Balance: Utilize branch dampers to balance air quantities only. Diffuser is to be 100 percent open. Use of opposed blade dampers at diffusers is **PROHIBITED**.
  - BB. Final measurements of air quantity will be taken after air terminals have been adjusted to provide optimum diffusion of air patterns.
  - CC. After final balance adjustments have been completed, a permanent black marker shall be used to mark the final position of the damper quadrant handle on the ductwork.
  - DD. Heat Transfer equipment: Measure and record entering and leaving coil air dry-bulb and wet-bulb temperatures, and entering and leaving coil water temperatures.
  - EE. Enthalpy Wheel (Heat Recovery Wheel): When an enthalpy wheel is provided, measure and record the wet bulb and dry bulb temperature measurements of the entering and leaving outside air and the pressure drop across the enthalpy wheel.
  - FF. Fan Adjustment: Vary total air system quantities only by fan speed adjustment or pulley replacement as required.
  - GG. Air Measurement: Utilize pitot tube traverse to measure duct air flow systems over 2000 CFM as conditions permit, unless otherwise specified.
  - HH. For duct design air quantity less than 2000 CFM, air quantity may be determined by measurements at air terminals served.
  - II. Test Holes: Locate in straight duct, as far downstream as possible from elbows, bends, takeoffs and other turbulence generating devices to optimize reliability of flow measurements. Seal holes with plastic plugs. No tape seals allowed. Ensure pitot traverse holes in insulated duct in non-conditioned space have centlok collars.
  - JJ. Return Air Plenum: Ensure an area being used as a return air plenum has a static pressure in excess of -0.25 Inch W.G.
  - KK. Ensure leakage across closed bypass dampers does not exceed 5 percent of total air stream.
  - LL. Smoke detectors are to be certified by the use of the pressure differential method.
  - MM. Provide a static profile across the air handling units to include pre-filters, final filters, coil and fan.
  - NN. Provide a building pressure test. Negative building pressure is **PROHIBITED**. Adjust the system under the direction of the Project Consultant in order to acquire and maintain a normal positive pressure of 0.077 Inches Water Gauge with all exterior doors closed.
  - OO. Outside Air Quantities: Measure and set all design outside air quantities by the pitot tube traverse method. If an accurate measurement is not possible, set all outside air quantities using the temperature method as established by NEBB and AABC.
  - PP. Deficiencies: Include in the final test and balance report, all deficiencies that prevent compliance to with the design intent of the contract documents.

## **WATER SYSTEM PROCEDURES**

- QQ. Heat Transfer Equipment:
1. Adjust as required to provide design flow (plus or minus 10 percent for coils, plus 10 percent or minus 5 percent for major equipment).
  2. Measure and record the entering and leaving water temperatures and flows at chillers, heat exchangers, cooling towers and coils.
- RR. Adjust distribution by using balancing devices (cocks, valves, fittings). Use of service valves not allowed. Ensure pump discharge is wide open at final flow.
- SS. Balance all cooling tower basins to have identical water levels at full flow. Ensure nozzle size and quantity are such that actual water level in basins is at manufacturer's specification with one balancing valve open.
- TT. Trim pump impellers as necessary to deliver design flow GPM.
- UU. Ensure all steel piping systems have had proper startup chemicals, cleaners, neutralizers and appropriate flushing before final filling of system and operation of equipment. Ensure water treatment is at controlled condition within one week of start of operation.
- VV. Adjust system pressure so that static pressure at uppermost section is a minimum of 15 PSIG.
- WW. Outside Air Quantities: Measure and set all design outside air quantities by the pitot tube traverse method. If an accurate measurement is not possible, set all outside air quantities using the temperature method as established by NEBB and AABC.
- XX. Deficiencies: Include in the final test and balance report, all deficiencies that prevent compliance to with the design intent of the contract documents.

#### **CONTROL VERIFICATION**

**A. Confirm that all controls function as per the design. Test all control devices such as outside air dampers, face and bypass dampers, CO2 sensors, chilled water valves, exhaust fan interlocks and other related controls to verify that they operate in their minimum/maximum and closed positions. Include a report in the final test and balance report showing all components.**

#### **OWNER'S ACCEPTANCE AT STARTUP CERTIFICATION**

- YY. Owner will verify 100 percent startup certification forms submitted by the Contractor. Ensure 100 percent of all data submitted is within **plus 10 percent or minus 5 percent** of that recorded in the startup certification report or certification will be automatically rejected. In the event the certification is rejected, readjust and test all systems, record new data and submit new certified startup certification prior to the Owner's Substantial Completion Inspection.

#### **VIBRATION AND NOISE**

- ZZ. Equipment vibrating or producing noise in excess of manufacturer's specifications or equipment producing noise in excess of specified noise levels will be corrected by the Contractor prior to Owner's acceptance of certification.

### **END OF SECTION**

**SITE CLEARING**  
**SECTION 31 10 00**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Section Includes:
1. Removing existing vegetation.
  2. Clearing and grubbing.
  3. Stripping and stockpiling topsoil.
  4. Removing above- and below-grade site improvements.
  5. Disconnecting, capping or sealing, removing site utilities, and abandoning site utilities in place.
  6. Temporary erosion and sedimentation control.

**1.2. RELATED SECTIONS**

- A. Section 01 50 00 Temporary Facilities and Controls.
- B. Section 01 56 39 Temporary Tree and Plant Protection.

**1.3. DEFINITIONS**

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
- D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.
- E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

#### 1.4. FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
  3. Salvageable Improvements: Carefully remove items indicated to be salvaged.
    - a. Clean salvaged items.
    - b. Pack or crate items after cleaning.
    - c. Identify contents of containers.
    - d. Store items in a secure area until delivery to Owner.
    - e. Transport items to Owner's storage area designated by Owner.

City of Tampa Parks Maintenance Facility  
Lowry Park  
7525 N Blvd  
Tampa FL 33604
    - f. Protect items from damage during transport and storage.
- B. Utility Locator Service: Notify Sunshine 811 (<https://www.sunshine811.com/>) for area where Project is located before site clearing, and comply with their requirements.
1. PLAN YOUR PROJECT - Gather all the information you need for your locate ticket. White lining your proposed dig site with white paint, flags or stakes is always recommended, and can be required when a member utility cannot understand the locate description.
  2. STEP 2: SUBMIT A TICKET  
Submit an online ticket using Exactix or call 8-1-1. A ticket is valid for 30 calendar days.
  3. STEP 3: WAIT FOR MARKS  
The required wait time is up to 2 full business days for members to clear or mark the dig site. The wait time does not include weekends and holidays. Please note: Member companies send their locators to mark underground lines, pipes and cables within the required time. Sunshine 811 does NOT mark underground utilities.
  4. STEP 4: CONFIRM POSITIVE RESPONSES  
Follow each member operator's progress throughout the required time frame by confirming their positive responses in Exactix. This also gives you time to respond to any instructions before the required wait time expires.
  5. STEP 5: CONFIRM THE MARKS  
Once you've received responses from all members, you're ready to head to the job site. Before you start digging compare the positive response codes to the marks you see at the dig site. If they don't match, contact the utility for clarification.



6. **STEP 6: DIG WITH CARE**

Once it's safe to dig, remember the marks are approximate and you must dig carefully near them. The underground facility's tolerance zone is 24 inches from the outer edges of a buried facility. Protect the locate marks throughout the project and request another ticket if the marks become faded or destroyed.

- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- D. Tree- and Plant-Protection Zones: Protect according to City of Tampa requirements and as detailed on the drawings.
- E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

**1.5. MATERIAL OWNERSHIP**

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

**PART 2 - MATERIALS**

**2.1. MATERIAL**

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

**PART 3 - EXECUTION**

**3.1. PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in the drawing package.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

**3.2. TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.3. TREE AND PLANT PROTECTION**

- A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

### **3.4. EXISTING UTILITIES**

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
  - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
  - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
- C. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- D. Excavate for and remove underground utilities indicated to be removed.
- E. Removal of underground utilities is included in earthwork sections.

### **3.5. CLEARING AND GRUBBING**

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
  - 3. Use only hand methods or air-spade for grubbing within protection zones.
  - 4. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
- C. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

### **3.6. TOPSOIL STRIPPING**

- A. Remove sod and grass before stripping topsoil.

- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- D. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
- E. Limit height of topsoil stockpiles to 60 inches.
- F. Do not stockpile topsoil within protection zones.
- G. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
- H. Stockpile surplus topsoil to allow for respreading deeper topsoil.

### **3.7. SITE IMPROVEMENTS**

- A. Remove existing above and below grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
  - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

### **3.8. DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

**END OF SECTION**

**EARTH MOVING**  
**SECTION 31 20 00**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Furnish all materials, equipment and labor as necessary for the installation of clean fill material over existing grade as shown and specified.
- B. The work includes: site preparation, placement of clean fill material, and compaction of clean fill material.

**1.2. RELATED SECTIONS**

- A. 32 93 00 Plants
- B. 32 84 23 Irrigation

**1.3. QUALITY ASSURANCE**

- A. Inclement weather: When fill operations are ceased due to weather, construction shall not be resumed until the Contractor has determined soil strength has not been adversely affected. If soil strength has been decreased, the affected portion of fill shall be rescarified, moistened or dried as required, and recompacted to the specified density.
- B. Inspection: The Contractor shall conduct daily inspections and more often as needed to verify that the specifications are met for the installation of materials.
- C. Utilities: Prior to work, Contractor shall verify the locations of all utilities which may be in the area.
- D. Drainage: The Contractor shall be responsible for the proper drainage of the site during the construction of the site.

**1.4. SUBMITTALS**

- A. General: Copies of all test results and field and office worksheets shall be furnished to the City within 72 hours after tests are complete.
- B. Test Reports: The testing agency shall submit the following reports, in duplicate, directly to the City Representative from the testing services, with copy going to the Contractor.
- C. Test report on fill material for soil classification.
- D. Field density reports and map of test location(s).
- E. One optimum moisture-maximum density curve for each type of soil used for fill material.
- F. Other reports of any testing hereinafter specified deemed necessary and requested by City of Tampa.
- G. A test location plan shall be included with each submittal.

## **1.5. PROJECT CONDITIONS**

- A. Topographic survey: Topographic information provided on plan is incorporated from ESRI One Foot Contour layer, translated into AutoCAD from ArcMap.
- B. Existing Utilities: Protect existing utilities, paving and other facilities from damage caused by fill operations.
- C. Work notification: Notify City of Tampa representative at least 7 working days prior to start of fill work.

## **PART 2 - MATERIALS**

### **2.1. MATERIAL**

- A. All fill materials shall be free from mud, refuse, construction debris, organic material, rock or gravel greater than 3 inches in any dimension.
- B. Unsuitable Materials: Areas of the site that do not meet density requirements due to unsuitable material shall be excavated and replaced with approved material in accordance with Part 3 - Execution.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. Contractor shall examine proposed sod areas and conditions for installation including but not limited to finish surfaces, grades, topsoil quality and depth.
- B. Do not start planting work until unsatisfactory conditions are corrected.

### **3.2. PREPARATION**

- A. Clear and grub site to remove overgrowth, existing grass and weeds down to bare earth.
- B. Plow and/or scarify area so fill material will bond with existing material.

### **3.3. INSTALLATION**

- A. Place clean fill material as needed. Place fill material in 6 inch lifts, compacting each lift lightly to settle material sufficiently to support sodding operations yet encourage root growth into fill material.
- B. Do not place fill material on surfaces that are muddy and/or too wet to compact as indicated.
- C. Final grading: After fill material is placed and compacted, fine grade area as noted in plans and specifications.

### **3.4. ACCEPTANCE**

- A. Inspection to determine acceptance of filled and graded area will be made by the City Representative, upon contractor's request.

- B. Provide notification at least 5 working days before requested inspection date.

**3.5. PROTECTION**

- A. Protection of Persons and Property: Barricade work area as necessary to secure site from trespass at all times.
- B. The Contractor shall protect, maintain, and restore if necessary benchmarks, monuments, and other permanent reference points affected by this work. If bench marks, monuments, and other permanent reference points are displaced or destroyed, points shall be re-established and markers reset under supervision of a licensed Land Surveyor at Contractor's expense.
- C. The Contractor shall protect structures, utilities, sidewalks, pavements, trees and other facilities from damage caused by fill operations.
- D. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff.

**3.6. CLEANING**

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from fill operations.

**END OF SECTION**

**SITE SEATING**  
**SECTION 32 33 43.13**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Section Includes
  - 1. Benches

**1.2. QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Manufacturer regularly engaged in manufacture of site furnishings for at least 50 consecutive years.
- B. Product Support: Products are supported with complete engineering drawings and design patents.
- C. Production: Orders are filled within a 40-day schedule.
- D. Facility Operator: Welders and machine operators are certified.

**1.3. REFERENCES**

- A. ASTM B 117            Standard Practice for Operating Salt Spray (Fog) Apparatus.
- B. ASTM D 522           Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
- C. ASTM D 523           Standard Test Method for Specular Gloss.
- D. ASTM D 2247          Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
- E. ASTM D 2794          Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- F. ASTM D 3359          Standard Test Methods for Measuring Adhesion by Tape Test.
- G. ASTM D 3363          Standard Test Method for Film Hardness by Pencil Test.
- H. ASTM G 155           Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
- I. ISO 1520                Paints and Varnishes – Cupping Test.
- J. ISO 2815                Paints and Varnishes – Buchholz Indentation Test.

#### **1.4. SUBMITTALS**

- A. Product Data: Submit manufacturer's product data, storage and handling requirements and recommendations, installation methods and available colors, styles, patterns and textures.
- B. Shop Drawings: Submit manufacturer's shop drawings, including plans and elevations, indicating overall dimensions.
- C. Samples:
  - 1. Submit manufacturer's samples of materials, finishes, and colors.
  - 2. Submit (1) sample of each item listed under Accessories.
- D. Warranty: Minimum of 3 Years from date of Invoice.

#### **1.5. DELIVERY, STORAGE AND HANDLING**

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area in accordance with manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packaging until installation.
- C. Handling: Protect materials and finish during handling and installation to prevent damage.

#### **1.6. WARRANTY**

- A. Warranty Information:
  - 1. Products will be free from defects in material and/or workmanship for a period of three years from the date of invoice.
  - 2. Manufacturer shall, at its option, repair, replace, or refund the purchase price of any items found defective upon inspection by an authorized Manufacturer service representative.

### **PART 2 - MATERIALS**

#### **2.1. MANUFACTURER(S)**

- A. Items in this section are specified by the City of Tampa ordinance.  
If a substitution is proposed, the contractor, at its own expense shall obtain in writing, approval from the Urban Design Coordinator in the Development Coordination Division of the City of Tampa's Development & Growth Management Department.
- B. Provide Benches manufactured by:

Landscape Forms, Inc.  
7800 E. Michigan Ave  
Kalamazoo, Michigan 49048



## **2.2. BENCHES**

### **A. "Plainwell" Benches**

1. Style:
  - a. Backed
2. Size:
  - a. Length: 73-1/4 inches
3. Mounting:
  - a. Surface Mount
4. Option:
  - a. One center arm

## **2.3. MATERIALS**

### **A. Seat and back panels:**

1. Wood: Solid stock wood boards with eased edges. Boards are 1-1/4" x 2" with 2-7/8" diameter half round face boards that conceal steel channels. Each board is fastened with at least four black Magni-coated steel screws. Individual boards can be replaced with ordinary tools.
  - a. Exterior Use:
    - i. Domestically sourced thermally modified ash.

- B. Frame: End supports with integral armrests are sand cast aluminum. Seat straps, back straps, and center straps are sand-cast aluminum. Leg section is 1-1/2" x 2" oval shape. End supports are connected by two A36 steel channels 1-1/2" x 9/16" x 3/16" fastened with black Magni-coated steel cap screws.

## **2.4. ACCESSORIES**

- A. Anchor Bolts: 304 / 316 Stainless Steel 3/8" Socket Headed Cap Screw W/ 304 Stainless Steel Concrete Drop in Anchor to match thread diameter. Install anchor flush per manufacturer's recommendations.

## **2.5. FABRICATION**

- A. Assembly: Shop assembled benches.

## **2.6. FINISHES**

- A. Finish on Wood:
  - 1. Wood for Exterior Use: Unfinished.
- B. Finish on Metal: Landscape Forms, Inc. "Pangard II".
  - 1. Primer: Rust inhibitor
  - 2. Topcoat: Thermosetting TGIC polyester powder coat. UV, chip, and flake resistant.
  - 3. Test Results: "Pangard II".
    - a. Gloss Consistency, Gardner 60 Degrees, ASTM D 523: Plus or minus 5 percent from standard.
    - b. UV Resistance, Color and Gloss, ASTM G 155, Cycle 7: Delta E less than 2 at 2.0 mils and less than 20 percent loss.
    - c. Cross-Hatch Adhesion, ASTM D 3359, Method B: 100 percent pass.
    - d. Flexibility Test, Mandrel, ASTM D 522: 3 mm at 2 mils.
    - e. Erichsen Cupping, ISO 1520: 8 mm.
    - f. Impression Hardness, Buchholz, ISO 2815: 95.
    - g. Impact Test, ASTM D 2794: 60 inch-pounds at 2.5 mils.
    - h. Pencil Hardness, ASTM D 3363: 2H minimum.
    - i. Corrosion Resistance, 1,500-Hour Test, ASTM B 117: Max. undercutting 1 mm.
    - j. Humidity Resistance, 1,500-Hour Test, ASTM D 2247: Max. blisters 1 mm.
  - 4. Color: Black.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. Site Examinations: Examine areas to receive benches.
  - 1. Verify that substrates are stable and capable of supporting the weight of items covered under this section.
  - 2. Verify that substrates have been adequately prepared to securely anchor those items that will be surface mounted.
  - 3. Notify Landscape Architect of conditions that would adversely affect installation or subsequent use.
  - 4. Do not begin installation until unacceptable conditions are corrected.

### **3.2. INSTALLATION**

- A. Install benches in accordance with manufacturer's instructions at locations indicated on the Drawings.

- B. Install benches level.

**3.3. ADJUSTING**

- A. Finish Damage: Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Landscape Architect.
- B. Component Damage: Remove and replace damaged components that cannot be successfully repaired as determined by Landscape Architect.

**3.4. CLEANING**

- A. Clean benches promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

**3.5. PROTECTION**

- A. Protect installed benches to ensure that, except for normal weathering, benches will be without damage or deterioration at time of Substantial Completion.

**END OF SECTION**

**ASPHALT PAVING**  
**SECTION 32 12 16**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Section Includes:
  - 1. Cold milling of existing asphalt pavement.
  - 2. Hot-mix asphalt patching.
  - 3. Hot-mix asphalt paving.
  - 4. Hot-mix asphalt overlay.

**1.2. RELATED SECTIONS**

- A. Section 02 41 19 Selective Demolition
- B. Section 31 20 00 Earth Moving
- C. Section 32 13 73 Concrete Paving Joint Sealants

**1.3. QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the City of Tampa Mobility Department.
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the City of Tampa Mobility Department for asphalt paving work.
- D. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

**1.4. REFERENCES**

- A. FDOT Standard Specifications
  - 1. SECTION 327 MILLING OF EXISTING ASPHALT PAVEMENT
  - 2. SECTION 330 HOT MIX ASPHALT - GENERAL CONSTRUCTION REQUIREMENTS
  - 3. SECTION 337 ASPHALT CONCRETE FRICTION COURSES

- B. City of Tampa
  - 1. TRANSPORTATION TECHNICAL MANUAL – Current Edition
  - 2. PAVEMENT/RIGHT OF WAY RESTORATION REQUIREMENTS – Most Current Revision

**1.5. SUBMITTALS**

- A. ACTION SUBMITTALS
  - 1. Product Data: For each type of product.
    - a. Include technical data and tested physical and performance properties.
    - b. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
    - c. Job-Mix Designs: For each job mix proposed for the Work.
- B. INFORMATIONAL SUBMITTALS
  - 1. Material Certificates: For each paving material.
  - 2. Material Test Reports: For each paving material, by a qualified testing agency.
  - 3. Field quality-control reports.

**1.6. PROJECT CONDITIONS**

- A. Per FDOT Standard Specifications

**PART 2 - MATERIALS**

**2.1. MATERIAL**

- A. Per City of Tampa Pavement/Right of Way Restoration Requirements

**PART 3 - EXECUTION**

**3.1. INSTALLATION**

- A. Per FDOT Standard Specifications & City of Tampa Pavement/Right of Way Restoration Requirements

**END OF SECTION**

## **FLEXIBLE PERVIOUS PAVING**

### **SECTION 32 12 43**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. This specification provides requirements for the construction of Flexi-Pave, porous flexible pavement. Flexi-Pave is highly porous, insulating, flexible paving material that is used as a Tree Preservation and Stormwater Mitigation tool in a variety of applications including sidewalks, trails, tree surrounds, potholes, green roofs, driveways, parking spots, diffusion strip drains, courtyards, wooden bridge overlays, inlet protection, playgrounds, splash parks, pool decks, etc.

##### **1.2. RELATED SECTIONS**

- A. 31 20 00 Earth Moving

##### **1.3. DEFINITIONS**

- A. ISA Certified Arborist: An individual certified by the International Society of Arboriculture who has been trained through education and experience to be knowledgeable in tree care, tree preservation and construction around trees.
- B. Base Reinforcement: The use of a geosynthetic within the aggregate base course to enhance the performance of a paving
- C. Panel: An individual paving slab bordered by joints or slab edges.
- D. Porous/Pervious/Permeable Paving: A paving comprising material with sufficient continuous voids to allow water to pass from the surface to the underlying layers.
- E. Porous/Pervious/Permeable: The property of a material which permits movement of water through it under ordinary hydrostatic pressure.
- F. Porous Flexible Paving: Paving system comprised of 3 principle components: recycled passenger car tire rubber granules, aggregate, and urethane binder that provides a strong, pervious, flexible pavement.
- G. Subbase: A layer in a paving system between the subgrade and the base course, or between the subgrade and a porous flexible paving.
- H. Subgrade: The soil prepared and compacted to support a structure or paving system.

##### **1.4. PERFORMANCE BASED STANDARDS**

- A. Porous Flexible Paving used on this project must meet the following minimum standard performance results:
- B. Initial Scuff / Power Steering Resistance

1. ISSA TB 100, Wet Track Abrasion @ 25° C. Pavement shall maintain 4.6 g/ft<sup>2</sup> @ 1 hour, 8.6 g/ft<sup>2</sup> @ 6 days.
  2. ISSA TB 139 cohesion measurement @ 25° C. Pavement shall maintain 15 kg-cm (solid spin)<sup>2</sup>.
  3. Accelerated Weathering @ 500 hours with Xenon Arc Cycle A, ISSA TB 100, Wet Track Abrasion @ 25° C. Pavement shall maintain 16.5 g/ft<sup>2</sup> @ 1 hour and 17.7 g/ft<sup>2</sup> @ 6 days.
- C. Permeability
1. FL DOT FM 5-565 @ 25° C. Pavement shall maintain 1.8x10<sup>-1</sup> cm/sec.
  2. FL DOT FM 5-565 @ field sample. Pavement shall maintain 1.1 x 10<sup>1</sup> cm/sec.
- D. Flexibility
1. PRI TM 025 @ 4" w X 2" t X 36" beams @ 25° C. Pavement shall maintain 2 mm average maximum deflection at center of beams with not cracks after 16 days and with no permanent deformation
- E. Hamburg Loaded Wheel Tester
1. TX DOT 242-F @ 60° C to 8000 cycles or 0.5" rut depth, whichever occurs first. Pavement shall maintain a 2.3 mm rut depth at 8000 cycles measured at end of test and pavement shall fully recover after 24 hours.
- F. Static Creep
1. TX DOT 231-F @ 60° C. Pavement shall maintain a total strain of +2.703% and permanent strain of 0.514%
- G. Resilient Modulus
1. ASTM D 4123 @ 25° C. Pavement shall maintain a value of 68,495.
- H. Slip Resistance
1. ASTM D 2047 @ 25° C, dry. Pavement shall maintain a value of 0.65.

## **1.5. QUALITY ASSURANCE**

- A. Installer Qualifications:
1. The technical requirements and short working time of moisture-cured polyurethane based porous flexible pavements dictate higher than normal investment from installers to master the material handling and installation techniques necessary to successfully use

and install this material. Therefore, installers must be certified, experienced and show proven competency through the following criteria.

2. Installers must:
  - a. Possess Porous Flexible Paving manufacturer's certification.
  - b. Employ at least one (1) full time employee who is an ISA Certified Arborist with at least 10 years of experience to oversee construction around trees.
  - c. Possess a minimum of 5 years continual experience installing Porous Flexible Pavement.
  - d. Offer a minimum 5-year warranty.
  - e. Exhibit proof that porous flexible pavement is the installer's primary business, and not ancillary to other services.
3. Finished porous flexible pavement must:
  - a. Have a smooth, monolithic and consistently uniform paving surface
  - b. Be composed of three (3) ingredients with the following weight distribution:
    - i. 46% 1/4" crumb rubber,
    - 46% 3/8" clean crushed aggregate
    - 8% single component moisture cured elastomeric polyurethane binder
  - c. Be ADA compliant to not exceed 2% side slopes & 5% running slopes
  - d. Have consistently formed 45-degree beveled edges
  - e. Have properly level, blended and finished cold seams between pours
  - f. Be free from visible bull-float and hand trowel finishing marks
  - g. Exhibit consistently parallel edges
  - h. Interface with adjacent materials in a seamless manner
  - i. Not possess significant visible surface variations, rough patches or sloughing

#### **1.6. SUBMITTALS**

- A. Installer Submittals:
  1. Provide manufacturers certification of training.
  2. Provide resume and copy of certificate for at least one (1) ISA Certified Arborist on staff



3. Provide proof of having minimum of 5 years of continual experience installing Porous Flexible pavement
4. Provide a copy of minimum 5-year warranty certificate.
5. Provide this project's proposed Mix Design.
6. Provide PDF showing installer's readily available pavement color choices.
7. Provide physical samples showing up to 5 selections by owner.
8. Provide proof that Porous Flexible Pavement is installer's primary business.

#### **1.7. PROJECT CONDITIONS**

- A. When hot weather is anticipated up to 95 degrees Fahrenheit, no special procedures are necessary.
- B. When temperatures are over 95 degrees, pavement cure rate increases by approximately 50% and material can become unworkable.
- C. In cold weather it is imperative that the polyurethane binder be kept above 45 degrees Fahrenheit until mixed with dry ingredients and placed. This requires the binder to be kept in enclosed heated containers protected from the elements. Binder that falls below 45 degrees becomes compromised and shall be discarded.
- D. When precipitation is imminent and temperatures will fall below freezing after installation, cover with polyethylene sheet and utilize a fan to maintain airflow over the paving during the curing process.

#### **1.8. WARRANTY**

- A. Contractor and subcontractor shall warrant its products against defects in workmanship and materials for a period of (60) months from the date of project acceptance.
- B. Contractor shall be responsible for repair or replacement of damage occurring prior to owner's acceptance at its own expense.

### **PART 2 - MATERIALS**

#### **2.1. MATERIAL**

- A. GEOTEXTILES & GEOGRIDS
  1. A non-woven, needle punched geotextile fabric such as Mirafi 140 or equal shall be installed as a soil separator whenever stone base course will be installed over existing exposed soil.
- B. BASE COURSE

1. Coarse aggregates shall meet the durability requirements of ASTM C 33. #57 stone, recycled concrete RC-57, or limerock shall be laid under pavement to a minimum depth of 4" for pedestrian use and a minimum of 6" for vehicular use. There is no maximum depth of stone. It shall be as specified per project. Stone shall be tamped to achieve relative compaction.

C. POROUS FLEXIBLE PAVING

1. Bonding: Have the capacity to bind with: wood; steel; concrete; aluminum; compacted aggregate; enamel tile, fiberglass.
2. Resistance to degradation: Resistant to: chlorine; ozone; bromine; muriatic acid; salt water; oil; transmission oil, hydraulic oil.

D. AGGREGATE:

1. Stone: Triple-washed #57 crushed granite, recycled concrete RC-57, or limerock per ASTM C 33, bagged, labeled, kept dry and under cover until installation.
2. Rubber: Recycled passenger tires ground to 1/4" nominal crumbs with 99.9% of the wire remnants removed and 90% of the chord removed.

E. BINDING AGENT:

1. Firm, Pedestrian and Light Vehicular Pavement Binder: Single component elastomeric moisture cured aromatic polyurethane liquid prepolymer based upon Diphenylmethane-Diisocyanate designed for permanently binding stone and rubber with a firm and flexible bond. The natural properties of aromatic binders is to produce an 'amber' tint on some lighter colored pavements, however this effect wears off with foot traffic and weathering.

**2.2. FABRICATION**

- A. MIX DESIGN: Design a tentative mix of materials and colors to prove the consistency intended for use on the specified work, including the following parameters.

1. Flexi-Pave Rubber/Stone Pavement - HD1000, HD1500, HD2000, HDX1000, HDX1500, HDX2000 (Flagship product for sidewalks, trails, tree surrounds, potholes, courtyards, green roofs, diffusion strip drains, etc.)
  - a. The volume by weight of aggregate per cu. yd. shall be 46% of the total mix.
  - b. The volume by weight of the rubber product per cu. yd. shall be 46% of the total mix.
  - c. The volume by weight of the urethane component per cu. yd. shall be 8% of the total mix.
  - d. The percentage of each rubber or stone component to match the selected final color.

- 2.3.** Permeability: Pervious infiltration rate of minimum 2,500 gallons/square foot/hour.

## **PART 3 - EXECUTION**

### **3.1. PREPARATION**

#### **A. SUBGRADE**

1. Prepare subgrade as specified in the contract documents.
2. Construct subgrade to ensure that the required paving thickness is obtained in all locations.
3. Keep all traffic off of the subgrade during construction to the maximum extent practical. Regrade subgrade disturbed by delivery vehicles or other construction traffic, as needed.
4. Compact the material added to obtain final subgrade elevation.
5. If requested, determine subgrade permeability in accordance with ASTM D3385 before porous paving placement. Confirm that subgrade permeability meets requirements of Contract Documents.

#### **B. SUBBASE**

1. Prepare subbase in accordance with contract documents.

### **3.2. SETTING FORMWORK**

1. Set, align, and brace forms so that the hardened paving meets the tolerances specified herein.
2. Apply form release agent to the form face which will be in contact with porous paving, immediately before placing paving.
3. The vertical face of previously placed concrete may be used as a form.
  - A. Protect previously placed paving from damage using masking.
  - B. Do not apply form release agent to previously placed concrete.
  - C. Apply liquid urethane bonding agent to face of surfaces when adhesion is desired
4. Placement width shall be as specified in Contract Documents.

### **3.3. BATCHING, MIXING, AND DELIVERY**

1. Batch and mix materials in a volumetric mixer on site in compliance with mix design. Discharge shall be completed within 1-2 minutes of the introduction of urethane to the dry products. Do not leave material in mixer more than 4 minutes or batch integrity will be compromised. Discard any material that has mixed for more than 5 minutes.

### **3.4. INSTALLATION**

#### **A. PLACING AND FINISHING PAVING**

1. Do not place porous flexible paving on wet subgrade or subbase.
2. Deposit porous flexible paving directly onto the stone base by either mixer chute, wheelbarrow or by material handler, unless otherwise specified.
3. Paving shall be a continuous operation with fresh batches being screeded into previously paid sections.
4. Deposit porous flexible paving between the forms to the specified depth.
5. Spread the porous flexible paving using a come-along, square-ended shovel or asphalt rake.
6. Utilize a screed to level to strike off material to a uniform finish.
7. Fill imperfections and divots with material from the same batch and smooth with magnesium hand trowels.
8. Use aluminum bull floats to compact and smoothly finish the pavement to elevations and thickness specified in mix design.
9. Finish all troweling and bull floating within 10 minutes of screeding material.
10. Finish edging with 45° chamfered edge using magnesium trowels.
11. Do not touch or tool pavement after it has been out of mixer for 15 minutes.
12. Pour stops or construction joints should be consistent with the approved joint plan.

#### **B. FINAL SURFACE TEXTURE**

1. Final surface of porous flexible paving shall be smoothed with aluminum bull float and magnesium trowels to a uniform smooth finish.

#### **C. EDGING**

1. When permanent forms are not used, bevel the edge of the side surface to a 45° chamfer.

#### **D. CURING**

1. Begin curing within 20 minutes of paving discharge. Do not handle, smooth, or otherwise touch pavement after 15 minutes or pavement integrity will be compromised, and potholing will result.

2. Completely cover the paving surface with a minimum 4 mil thick polyethylene sheet only if rain or sprinklers are imminent within 20 minutes. Cut sheeting to a minimum of a full placement width.
3. Cover all exposed edges of paving with polyethylene sheet.
4. Secure curing cover material without using dirt or placing heavy items over sheet.
5. Cure paving for a minimum of 24 uninterrupted hours until it is fully cured, which can be observed if it is hard to the touch and dry. If surface is still tacky after 24 hours, leave protected for another 24 hours before opening for use. Maintain a protective fence around the pavement until fully cured.

### **3.5. MAINTENANCE**

- A. Provide owner with current maintenance requirements as provided by the manufacturer.

### **3.6. PROTECTION**

- A. Do not open the paving to pedestrian traffic until the porous flexible paving has cured for at least 24 hours and not until the porous flexible paving is accepted by the Owner for opening to traffic.
- B. Paving should be checked and verified to be sufficiently hardened after the curing period as relative humidity can alter the curing time in some regions.
- C. Protect finish during all construction activities until final project inspection and acceptance. Damage may require replacement at no cost to the owner.

**END OF SECTION**

**CONCRETE PAVING**  
**SECTION 32 13 13**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Supply and delivery of Ready-Mix Concrete
  - 1. Section Includes:
    - a. Concrete Paving Including the Following:
      - i. Curbs and gutters
      - ii. Walks.

**1.2. RELATED SECTIONS**

- A. Section 32 13 73 - Concrete Paving Joint Sealants
- B. Section 32 17 23 - Pavement Markings
- C. Section 32 17 26 - Tactile Warning Surfacing

**1.3. REFERENCES**

- A. ACI 301 – Specifications for Concrete Construction
- B. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
- C. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete
- D. ASTM C 1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
- E. ASTM C 1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete
- F. ASTM E 329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
- G. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- H. ASTM D3575 - Standard Test Methods for Flexible Cellular Materials Made From Olefin Polymers.
- I. CRSI - Manual of Standard Practice

#### **1.4. DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

#### **1.5. QUALITY ASSURANCE**

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
- B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
  - 2. Build mockups of concrete paving where directed by Landscape Architect and not less than 96 inches by 96 inches.
  - 3. Include full-size detectable warning in the mockup.
  - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### **1.6. SUBMITTALS**

- A. ACTION SUBMITTALS
  - 1. Product Data: For each type of product.
  - 2. Design Mixtures: For each concrete paving mixture.
    - a. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- B. INFORMATIONAL SUBMITTALS

1. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.
2. Material Certificates: For the following, from manufacturer:
  - a. Cementitious materials.
  - b. Steel reinforcement and reinforcement accessories.
  - c. Fiber reinforcement.
  - d. Admixtures.
  - e. Curing compounds.
  - f. Applied finish materials.
  - g. Bonding agent or epoxy adhesive.
  - h. Joint fillers.
3. Material Test Reports: For each of the following:
  - a. Aggregates
4. Field quality-control reports.

#### **1.7. DELIVERY, STORAGE, AND HANDLING**

- A. materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Protect materials during handling and application to prevent damage.

### **PART 2 - MATERIALS**

#### **2.1. FORMS**

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

#### **2.2. STEEL REINFORCEMENT**

- A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064, fabricated from steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615, Grade 60; deformed.
- C. Tie Bars: ASTM A 615, Grade 60; deformed.



- D. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place.
  - 1. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
    - a. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

### **2.3. CONCRETE MATERIALS**

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
  - 1. Portland Cement: ASTM C 150, gray portland cement Type I/II.
  - 2. Fly Ash: NOT PERMITTED
- B. Normal-Weight Aggregates: ASTM C 33 uniformly graded. Provide aggregates from a single source.
- C. Maximum Coarse-Aggregate Size: 1 inch nominal.
- D. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. Air-Entraining Admixture: ASTM C 260.
- F. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
  - 1. Water-Reducing Admixture: ASTM C 494, Type A.
  - 2. Retarding Admixture: ASTM C 494, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
- G. Water: Potable and complying with ASTM C 94.

### **2.4. FIBER REINFORCEMENT**

- A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in decorative concrete paving, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
- B. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in decorative concrete paving, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.

## **2.5. CURING MATERIALS**

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry or cotton mats.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

## **2.6. JOINT FILLERS**

- 1. Asphalt-saturated Fibrous Strips
  - a. Asphalt-saturated cellulosic fiber in preformed strips per ASTM D 1751.
- 2. Foam Expansion Joint Filler
  - a. Flexible, lightweight, non-staining, closed cell polyethylene. It shall be a chemical-resistant, ultraviolet stable, non-absorbent, low density, compressible foam and have the following requirements:
    - i. Density, ASTM D1751: 2.0 Ibs/cu.ft. (32.04 kg/cu. m)
    - ii. Compression, ASTM D3575
    - iii. 10% Deflection: 10 psi (69 KPa) maximum.
    - iv. 80% Deflection: 125 psi (862.49 KPa) max.
    - v. Tensile Strength, ASTM D3575: 55 psi (379.50 KPa)
    - vi. Water Absorption, ASTM D3575: 0.5% vol. maximum.
    - vii. Temperature Stability: -40°C to 71°C (-40°F to 160°F).

## **2.7. RELATED MATERIALS**

- A. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- B. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
  - 1. Types I and II, nonload bearing for bonding hardened or freshly mixed concrete to hardened concrete.

## **2.8. CONCRETE MIXTURES**

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements
- B. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.
- C. Concrete Mixtures: Normal-weight concrete.
1. Compressive Strength (28 Days): 3000 psi (27.6 MPa).
  2. Maximum W/C Ratio at Point of Placement: 0.50.
  3. Slump Limit: 3.5 inches, plus or minus 1.5 inches.

## **2.9. CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
  2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
  3. Provide batch ticket for each batch discharged and used in the Work, indicating:
    - a. Project identification name and number
    - b. Date
    - c. Mixture type
    - d. Mixing time
    - e. Quantity
    - f. Amount of water added

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2. PREPARATION**

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

### **3.3. EDGE FORMS AND SCREED CONSTRUCTION**

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

### **3.4. STEEL REINFORCEMENT INSTALLATION**

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

### **3.5. JOINTS**

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
  - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Expansion Joints: Install expansion-contraction joint filler in accordance with manufacturer's instructions.
  - 1. Attach expansion joint filler securely to the existing concrete slab, coping or form with tape or mechanical fasteners prior to pouring the concrete slab.
  - 2. Ensure that the expansion joint filler is level with the desired slab surfaces prior to finishing.

3. Remove the pre-scored strip if applying joint sealant.
  4. Seal the concrete with joint sealant.
- C. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
  2. Provide tie bars at sides of paving strips where indicated.
  3. Butt Joints: Use [bonding agent] [epoxy-bonding adhesive] at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
  5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- D. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
  2. Extend joint fillers full width and depth of joint.
  3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes.

2. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
- F. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
1. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
- G. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- H. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes.

### **3.6. CONCRETE PLACEMENT**

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
- G. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further

disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
  - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

### **3.7. FLOAT FINISHING**

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
  - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.
  - 2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

### **3.8. DETECTABLE WARNING INSTALLATION**

- 1. Cast-in-Place Detectable Warning Tiles:
  - a. Form blockouts in concrete for installation of tiles specified in Section 321726 "Tactile Warning Surfacing."
  - b. Screed surface of concrete where tiles are to be installed to elevation, so that edges of installed tiles will be flush with surrounding concrete paving.
  - c. Embed tiles in fresh concrete to comply with Section 321726 "Tactile Warning Surfacing" immediately after screeding concrete surface.

### **3.9. CONCRETE PROTECTION AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.

- C. Evaporation Retarder:
  - 1. Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations.
  - 2. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by curing compound as follows:
  - 1. Curing Compound:
    - a. Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions.
    - b. Recoat areas subjected to heavy rainfall within three hours after initial application.
    - c. Maintain continuity of coating, and repair damage during curing period.

### **3.10. PAVING TOLERANCES**

- A. A. Comply with tolerances in ACI 117 and as follows:
  - 1. Elevation: 3/4 inch.
  - 2. Thickness: Plus 3/8-inch, minus 1/4 inch.
  - 3. Surface: Gap below 10-feet long; unlevelled straightedge not to exceed 1/2 inch.
  - 4. Dowels:
    - a. Lateral Alignment and Spacing: 1 inch.
    - b. Vertical Alignment of Dowels: 1/4 inch.
  - 5. Joint Spacing: 3 inches.
  - 6. Contraction Joint Depth: Plus 1/4 inch, no minus.
  - 7. Joint Width: Plus 1/8 inch, no minus.

### **3.11. FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.



- B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143 one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39; test one specimen at seven days and two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.

- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

**3.12. REPAIR AND PROTECTION**

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Landscape Architect.
- B. Drill test cores, where directed by Landscape Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

**END OF SECTION**

## CONCRETE PAVING JOINT SEALANTS

### SECTION 32 13 73

#### PART 1 - GENERAL

##### 1.1. DESCRIPTION OF WORK

- A. Includes:
  - 1. Silicone paving joint sealants.

##### 1.2. QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

##### 1.3. REFERENCES

- A. ASTM C 1193 Standard Guide for Use of Joint Sealants.
- B. ASTM C 719 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement
- C. ASTM D 412 Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
- D. ASTM D 2240 Test Method for Rubber Property - Durometer Hardness.
- E. ASTM D 5249 Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints
- F. ASTM D 5893 Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

##### 1.4. SUBMITTALS

- A. Action Submittals
  - 1. Product Data: For each type of product.
  - 2. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
  - 3. Paving-Joint-Sealant Schedule: Include the following information:
    - a. Joint-sealant application, joint location, and designation.
    - b. Joint-sealant manufacturer and product name.
    - c. Joint-sealant formulation.
    - d. Joint-sealant color.

- B. Informational Submittals
  - 1. Qualification Data: For Installer.
  - 2. Product Certificates: For each type of joint sealant and accessory.

**1.5. DELIVERY, STORAGE AND HANDLING**

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer

**1.6. PROJECT CONDITIONS**

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

**1.7. WARRANTY**

- A. Special Manufacturer's Warranty, General: Manufacturer's standard form in which paving sealant manufacturer agrees to furnish paving sealants to repair or replace those that demonstrate deterioration or failure within warranty period specified.
- B. Warranty Period for Silicone Sealants: [5] years from date of Substantial Completion

**PART 2 - MATERIALS**

**2.1. MATERIAL**

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Self-Leveling Joint Sealant
  - 1. Single-Component, Self-Leveling, Silicone Paving Sealant ASTM D 5893, Type SL.

- a. Basis of Design Product: DOWSIL™ 890-SL Silicone Joint Sealant.
  - b. Joint Movement Capability, ASTM C 719: 100/50, 10 cycles, no failure.
  - c. Elongation, ASTM D 412: 1400 percent, minimum.
  - d. Hardness, ASTM D 2240: 50 durometer Shore 00, minimum
  - e. Volatile Organic Compound (VOC) Content: 30 g/L maximum.
  - f. Color: Gray
- C. Joint-Sealant Backer Materials
- 1. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
  - 2. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. joint profiles and surfaces to determine if work is ready to receive paving sealants. Verify joint dimensions are adequate for development of sealant movement capability. Proceed with paving sealant work once conditions meet sealant manufacturer's recommendations.
  - 1. Joint Size Limitations: Comply with width, width-to-depth ration, thickness of joint sealant, and depth of recess limitations published by manufacturer for specific products.

### **3.2. PREPARATION**

- A. Joint Surface Cleaning: Clean joints not more than two hours prior to installing paving sealants using materials and methods recommended by sealant manufacturer.
  - 1. Remove laitance, form-release agents, dust, and other contaminants.
  - 2. Porous surfaces: Grinding, saw cutting, sand or water blast cleaning, or mechanical abrading followed by vacuum cleaning or blasting with oil-free compressed air.
  - 3. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C 1193.
  - 4. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.

### **3.3. INSTALLATION**

- A. General: Install sealants using methods recommended by sealant manufacturer unless more stringent requirements are indicated. Comply with recommendations in ASTM C 1193.
- B. Joint Backing: Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of paving sealant allowing optimal sealant movement. Install continuously without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.

1. Install bond breaker tape over substrates when sealant backings are not used.
- C. Sealant Application: Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
  1. Use sealant-dispensing equipment to push sealant bead into opening. Fill joint opening to full and proper configuration. Apply in continuous operation. Ensure sealant fills entire joint and firmly contacts all surfaces.

#### **3.4. CLEANING**

- A. Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
  1. Remove masking tape after tooling joint without disturbing seal.
  2. Remove excess sealant while still uncured.

#### **3.5. PROTECTION**

- A. Allow sealant to skin over and follow manufacturer's recommendations prior to allowing exposure to traffic.
- B. Use test specimens formed at time of sealant application to verify curing time.
- C. Prevent damage to joint sealants resulting from construction operations or other causes.
- D. Replace damaged joint sealants at time of Substantial Completion.

#### **3.6. FIELD QUALITY CONTROL**

- A. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method
  1. Perform [5] tests for the first 1000 feet of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet of joint length thereafter, minimum.
  2. For sealant applied between dissimilar materials, test both sides of joint.
- B. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- C. Submit report of field adhesion testing indicating tests, locations, dates, results, and remedial actions taken.

**END OF SECTION**

**BRICK UNIT PAVING**  
**SECTION 32 14 16**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Section Includes:
  - 1. Brick pavers set in sand setting beds.

**1.2. RELATED SECTIONS**

- A. Section 32 13 13 Concrete Paving

**1.3. QUALITY ASSURANCE**

- A. Mockups:
  - 1. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.4. REFERENCES**

- A. AASHTO M 288
- B. ASTM C 67 Standard Test Methods for Sampling & Testing Brick and Structural Clay Tile
- C. ASTM C 136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- D. ASTM D 698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- E. ASTM C 902 Standard Specification for Pedestrian and Light Traffic Paving Brick
- F. ASTM D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
- G. ASTM D 4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus
- H. ASTM D 4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
- I. ASTM D 4751 Standard Test Methods for Determining Apparent Opening Size of a Geotextile

## **1.5. SUBMITTALS**

### **A. ACTION SUBMITTALS**

1. Product Data: For materials other than water and aggregates.
2. Product Data: For the following:
  - a. Pavers.
3. Sieve Analyses: For aggregate setting-bed materials, according to ASTM C 136.
4. Samples for Initial Selection: For each type of unit paver indicated.

### **B. INFORMATIONAL SUBMITTALS**

1. Material Certificates:
  - a. For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards.
  - b. Provide for each type and size of unit.
2. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for unit pavers, indicating compliance with requirements.

## **1.6. DELIVERY, STORAGE AND HANDLING**

- A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquids in tightly closed containers protected from outside conditions.

## **1.7. PROJECT CONDITIONS**

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

## **1.8. WARRANTY**

- A. Refer to general conditions for construction warranty.

## **PART 2 - MATERIALS**

### **2.1. MANUFACTURER(S)**



A. Basis of Design

1. Paver provided shall conform to the specifications and color range of the English Edge Autumn Paver as manufactured by:

Pine Hall Brick Co., Inc.  
Winston-Salem, North Carolina

**2.2. MATERIAL**

A. BRICK PAVERS

1. Brick Pavers: Light-traffic paving brick; ASTM C 902, Class SX, Type I Application PX. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.
2. Units shall be standard 4" x 8" size having dimensions of 2 1/4" x 4" x 8" with square-edge on both sides, 8,000 psi minimum compressive strength and below 8% cold water absorption.
3. Efflorescence: Brick shall be rated "not effloresced" when tested according to ASTM C 67.
4. Temporary Protective Coating: Precoat exposed surfaces of brick pavers with a continuous film of a temporary protective coating that is compatible with brick, mortar, and grout products and can be removed without damaging grout or brick. Do not coat unexposed brick surfaces; handle brick to prevent coated surfaces from contacting backs or edges of other units. If, despite these precautions, coating does contact bonding surfaces of brick, remove coating from bonding surfaces before setting brick.

B. CURBS AND EDGE RESTRAINTS

1. Job-Built Concrete Edge Restraints: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mixed concrete with minimum 28-day compressive strength of 3000 psi (20 MPa).

C. AGGREGATE SETTING-BED MATERIALS

1. Graded Aggregate for Base: Sound, crushed stone or gravel complying with [ASTM D 448 for Size No. 8] [ASTM D 2940/D 2940M, base material]
2. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33/C 33M for fine aggregate.
3. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing No. 200 (0.075-mm) sieve.
4. Geotextile: Woven geotextile fabric, manufactured for separation applications; made from polyolefins or polyesters, with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - a. Survivability: Class 2, AASHTO M 288.

- b. Apparent Opening Size: No. 60 (0.250-mm) sieve, maximum; ASTM D 4751.
  - c. Permittivity: 0.02 per second, minimum; ASTM D 4491.
  - d. UV Stability: 50 percent after 500 hours' exposure, ASTM D 4355.
5. Herbicide: Commercial chemical for weed control, registered with the EPA. Provide in granular, liquid, or wettable powder form.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. Examine surfaces indicated to receive unit paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2. PREPARATION**

- A. Sweep concrete substrates to remove dirt, dust, debris, and loose particles.
- B. Proof-roll prepared subgrade according to requirements in Section 312000 "Earth Moving" to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive base course for unit pavers.

### **3.3. INSTALLATION**

- A. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- D. Handle protective-coated brick pavers to prevent coated surfaces from contacting backs or edges of other units. If, despite these precautions, coating does contact bonding surfaces of brick, remove coating from bonding surfaces before setting brick.
- E. Joint Pattern: Herringbone with a header border as indicated on the drawings.
- F. Tolerances: Do not exceed 1/16-inch (1.6-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches (3 mm in 600 mm) and] 1/4 inch in 10 feet (6 mm in 3 m) from level, or indicated slope, for finished surface of paving.
- G. All edge restraints are designed as Cast-in-Place concrete elements as indicated. Install edge restraints before placing unit pavers.
- H. Install job-built concrete edge restraints to comply with requirements in Section 033000 "Cast-in-Place Concrete."

1. Allow concrete to cure before placing aggregate base, setting bed and remainder of pavers. Hold top of concrete below aggregate setting bed.

#### **3.4. AGGREGATE SETTING-BED APPLICATIONS**

- A. Compact soil subgrade uniformly to at least 95 percent of ASTM D 698 laboratory density.
- B. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Landscape Architect, and replace with compacted backfill or fill as directed.
- C. Place geotextile over prepared subgrade, overlapping ends and edges at least 12 inches.
- D. Place aggregate base, compact to 100 percent of ASTM D 1557 maximum laboratory density, and screed to depth indicated.
- E. Place leveling course and screed to a thickness of 1 to 1-1/2 inches (25 to 38 mm), taking care that moisture content remains constant and density is loose and uniform until pavers are set and compacted.
- F. Treat leveling course with herbicide to inhibit growth of grass and weeds.
- G. Set pavers with a minimum joint width of 1/16 inch (1.5 mm) and a maximum of 1/8 inch (3 mm), being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch with pieces cut to fit from full-size unit pavers.
- H. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf (16- to 22-kN) compaction force at 80 to 90 Hz. Use vibrator with neoprene mat on face of plate or other means as needed to prevent cracking and chipping of pavers. Perform at least three passes across paving with vibrator.
- I. Compact pavers when there is sufficient surface to accommodate operation of vibrator, leaving at least 36 inches (900 mm) of uncompacted pavers adjacent to temporary edges.
- J. Before ending each day's work, compact installed concrete pavers except for 36-inch (900-mm) width of uncompacted pavers adjacent to temporary edges (laying faces).
- K. As work progresses to perimeter of installation, compact installed pavers that are adjacent to permanent edges unless they are within 36 inches (90 mm) of laying face.
- L. Before ending each day's work and when rain interrupts work, cover pavers that have not been compacted and cover leveling course on which pavers have not been placed with nonstaining plastic sheets to protect them from rain.
- M. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
- N. Do not allow traffic on installed pavers until sand has been vibrated into joints.

- O. Repeat joint-filling process 30 days later.

**3.5. REPAIRING, POINTING AND CLEANING**

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units.
- B. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- C. Remove temporary protective coating as recommended by coating manufacturer and as acceptable to paver and grout manufacturers

**3.6. MAINTENANCE**

- A. Provide owner with current maintenance requirements as provided by the manufacturer.

**3.7. PROTECTION**

- A. Protect surface during all construction activities until final project inspection and acceptance. Damage to surface may require replacement at no cost to the owner.

**END OF SECTION**

## **PAVEMENT MARKINGS**

### **SECTION 32 17 23**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. Section includes markings applied to asphalt and concrete pavement.

##### **1.2. RELATED SECTIONS**

##### **1.3. PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at the Project site
  - 1. Review methods and procedures related to marking pavement including, but not limited to, the following:
    - a. Pavement aging period before application of pavement markings.
    - b. Review requirements for protecting pavement markings, including restriction of traffic during installation period.

##### **1.4. QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of SECTION 711 THERMOPLASTIC PAVEMENT MARKINGS of the FDOT The Standard Specifications for Road and Bridge Construction for pavement-marking work.
  - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

##### **1.5. REFERENCES**

- A. FDOT Standard Specifications
  - 1. SECTION 711 THERMOPLASTIC PAVEMENT MARKINGS
  - 2. SECTION 971 PAVEMENT MARKING MATERIALS

##### **1.6. SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include technical data and tested physical and performance properties.
- B. Shop Drawings: For pavement markings.
  - 1. Indicate pavement markings, colors, lane separations, defined parking spaces, and dimensions to adjacent work.

2. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.
- C. Samples: For each exposed product and for each color and texture specified; on rigid backing, 8 inches (200 mm) square.

## **PART 2 - MATERIALS**

### **2.1. MATERIALS**

#### A. Pavement-Marking

##### 1. Standard Thermoplastic

- a. Per FDOT Standard Specifications - Section 971-5 Standard Thermoplastic Material.

##### 2. Preformed Thermoplastic

- a. Per FDOT Standard Specifications - Section 971-6 Preformed Thermoplastic Material.

#### B. Beads:

1. Per FDOT Standard Specifications - Section 971-2 Glass Spheres

## **PART 3 - EXECUTION**

### **A. INSTALLATION**

Per FDOT Standard Specifications  
Section 711-4 Application of THERMOPLASTIC PAVEMENT MARKINGS.

**END OF SECTION**

## TACTILE WARNING SURFACING

### SECTION 32 17 26

#### PART 1 - GENERAL

##### 1.1. DESCRIPTION OF WORK

###### A. SUMMARY

1. Section Includes:
  - a. Cast-in-place detectable warning tiles.

##### 1.2. RELATED SECTIONS

- A. Section 32 13 13 - Concrete Paving

##### 1.3. DEFINITIONS

##### 1.4. QUALITY ASSURANCE

- A. Provide Replaceable Cast in Place Detectable/Tactile Warning Tiles and accessories as produced by a single manufacturer with a minimum of three (3) years experience in the manufacturing of Cast in Place Detectable/Tactile Warning Tiles.
- B. Installer's Qualifications: Engage an experienced installer certified in writing by Replaceable Cast in Place Detectable/Tactile Warning Tile manufacturer as qualified for installation, who has successfully completed installations similar in material, design, and extent to that indicated for project.
- C. Americans with Disabilities Act (ADA): Provide Replaceable Detectable/Tactile Warning Tiles which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act (Title III Regulations, 28 CFR Part 36 ADA STANDARDS FOR ACCESSIBLE DESIGN, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES).
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Specified test criteria
  1. ASTM D 695            Compressive Strength            Not less than 25,000 psi
  2. ASTM D 790           Flexural Strength                Not less than 30,000
  3. ASTM D 570           Water Absorption                 0.05%
  4. ASTM C 1028          Slip Resistance                    0.8 wet/dry
  5. ASTM E 84            Flame Spread Index               < or = 25
  6. ASTM B 117           Salt Spray No Change            (300 hours)

7. ASTM 1308	Chemical Stain	No Effect
8. ASTM C 501	Abrasion Resistance	Lw>500
9. ASTM G 155	Accelerated Weathering	Delta E<5 (2,000 hours)
10. ASTM D 638	Tensile Strength	12,500 psi
11. AASHTO-H20	Load Bearing at 10,410 lbs.	No Cracking, Delamination or Deformation
12. ASTM C 1026	Freeze/Thaw/Heat	No Chipping, Cracking or Peeling
13. ASTM D 1037	Accelerated Aging [Freeze/Thaw]	No Change in Color, Gloss or Delamination
14. ASTM D 696-03	Linear Thermal Expansion	9.45 x 10 <sup>-7</sup> per ° Fahrenheit

**1.1. REFERENCES**

- A. Refer to Specified Test Criteria for References.

**1.2. SUBMITTALS**

A. ACTION SUBMITTALS

- 1. Product Data: Submit manufacturer’s literature describing products, installation procedures and routine maintenance.
- 2. Samples for Verification Purposes: Submit two (2) tile samples minimum 12”x12” of the kind proposed for use.
- 3. Shop drawings are required for products specified showing fabrication details, composite structural system, tile surface profile, fastener and anchor locations, plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.
- 4. Material Test Reports:
  - a. Submit complete test reports from qualified accredited independent testing laboratories to qualify that materials proposed for use are in compliance with requirements and meet or exceed the properties indicated on the specifications.
  - b. All tests shall be conducted on a Replaceable Cast In Place Detectable Tactile Warning Tile system as certified by a qualified independent testing laboratory and be current within a 60 month period.

B. CLOSEOUT SUBMITTALS

- 1. Maintenance Data: For tactile warning surfacing, to include in maintenance manuals.

**1.3. DELIVERY, STORAGE AND HANDLING**

- A. Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by



sturdy plastic wrappings to protect tile from concrete residue during installation and tile type shall be identified by part number.

- B. Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be delivered to location at building site for storage prior to installation.

#### **1.4. PROJECT CONDITIONS**

- A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive Replaceable Cast in Place Detectable/Tactile Warning Tiles for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.
- B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the general public. Provide barricades or screens to protect the general public.

#### **1.5. WARRANTY**

- A. Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be warranted in writing for a period of five (5) years from date of final completion.
- B. The guarantee includes defective work, breakage, deformation, fading and loosening of tiles.

### **PART 2 - MATERIALS**

#### **2.1. MANUFACTURER(S)**

- A. The Engineered Polymer Composite Replaceable Cast In Place Detectable/Tactile Warning Tile specified is based on Access Tile manufactured by Access Products, Inc. (888-679-4022)
- B. Engineered and field tested products, which have been in successful service for a period of three (3) years are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.

#### **2.2. TACTILE WARNING SURFACING, GENERAL**

- A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and Florida Building Code - Accessibility, Seventh Edition (2020) for tactile warning surfaces.
  - 1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.
- B. Source Limitations: Obtain each type of tactile warning surfacing, anchors, and fasteners from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

#### **2.3. DETECTABLE WARNING TILES**

- A. Cast-in-Place Detectable Warning Tiles: Accessible truncated-dome detectable warning tiles with replaceable surface configured for setting flush in new concrete walkway surfaces, with slip-resistant surface treatment on domes and field of tile.
- B. Material: Engineered reinforced polymer tile.
- C. Color: Black conforming to Federal Color 17038 / RAL 9005 and referred to as Onyx Black (BK) per the manufacturer's full line per Basis of Design.
- D. Shapes and Sizes:
  - 1. Rectangular panel:
    - a. 24 by 24 inches
    - b. 24 by 36 inches
    - c. 24 by 60 inches
  - 2. Radius panel, nominal 24 inches deep by 20' outside radius.
  - 3. Dome Spacing and Configuration
    - a. 2.35-inch spacing in manufacturer's standard pattern.
- E. Mounting:
  - 1. Replaceable detectable warning tile wet-set into freshly poured concrete and surface-fastened to permanently embedded anchors per the manufacturer's current installation instructions.

**2.4. ACCESSORIES**

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:
  - 1. Tamper-Proof Stainless-Steel Fastener with Nylon Anchors as provided by the manufacturer for exterior use.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

- A. Prior to placement of the Replaceable Cast in Place Detectable/Tactile Warning Tile system, review manufacturer's instructions and contract drawings with the Contractor prior to the construction and refer any and all discrepancies to Landscape Architect.

**3.2. PREPARATION**

- A. The concrete pouring and finishing operations require typical mason's tools, however, a 4' long level with electronic slope readout, and 10 lb. sandbags are specific to the installation of the Replaceable Cast in Place Detectable/Tactile Warning Tile system.

- B. The factory-installed plastic sheeting must remain in place during the entire installation process to prevent the splashing of concrete onto the finished surface of the tile.
- C. When preparing to set the tile, it is important that no concrete be removed in the area to accept the tile. It is imperative that the installation technique eliminates any air voids under the tile. Gaps in the tile allow air to escape during the installation process.

### **3.3. INSTALLATION**

- A. During the Replaceable Cast in Place Detectable/Tactile Warning Tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.
- B. The specifications and related materials shall be in strict accordance with the contract documents and the guidelines set by their respective manufacturers.
- C. The physical characteristics of the concrete shall be consistent with the contract specifications while maintaining a slump range of 4 - 5 to permit solid placement of the Replaceable Cast in Place Detectable/Tactile Warning Tile system. An overly wet mix will cause the tile to float. Under these conditions, suitable weights such as sandbags shall be placed on tile.
- D. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. Immediately after finishing concrete, the electronic level should be used to check that the required slope is achieved. The tile shall be placed true and square to the curb edge in accordance with the contract drawings. The Replaceable Cast in Place Detectable/Tactile Warning Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the field level of the tile is flush to the adjacent concrete surface. The embedment process should not be accomplished by stepping on the tile as this may cause uneven setting which can result in air voids under the tile surface. The contract drawings indicate that the tile field level (base of truncated dome) is flush to adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes.

### **3.4. PROTECTION**

- A. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section.
  - 1. Remove in complete sections from joint to joint unless otherwise approved by Architect.
  - 2. Replace using tactile warning surfacing installation methods acceptable to Landscape Architect.
- B. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material until final acceptance by owner.

**END OF SECTION**

## **PLAYGROUND RESILIENT SURFACING**

### **SECTION 32 18 16**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. Furnish labor, material, and equipment necessary to install the poured-in-place, resilient surfacing system as shown on the drawings and specified herein.
- B. Work shall include, but not be limited to the following:
  - 1. layout; excavation; backfill; furnishing and installing of base material;
  - 2. furnishing and installing of poured-in-place, resilient surfacing and all other incidental work to provide a complete resilient surfacing system.
- C. Poured in place playground surfacing shall consist of a polyurethane binder mixed with recycled rubber, which will make up the attenuation cushion layer. The attenuation cushion layer is capped with EPDM, mixed with a polyurethane binder creating the Wear Course. Surfaces shall comply with ADA and CPSC guidelines as well as ASTM Standards.

##### **1.2. RELATED SECTIONS**

##### **1.3. DEFINITIONS**

- A. IPEMA - International Play Equipment Manufacturers Association
- B. PIP – Poured in Place (Playground Resilient Surfacing)

##### **1.4. QUALITY ASSURANCE**

- A. Manufacturer is to be certified by IPEMA, a third-party testing organization for playground surfaces and equipment.

##### **1.5. REFERENCES**

- A. ASTM International
- B. ASTM D2047 - Standard test method for determining the static coefficient of friction of ceramic tile and other like surfaces by the horizontal dynamometer pull meter method. This standard replaces ASTM C1028.
- C. ASTM D412 – Standard test methods for vulcanized rubber and thermoplastic rubbers and thermoplastic elastomers-tension.
- D. ASTM D624 - Standard test method for tear strength of conventional vulcanized rubber and thermoplastic elastomers.

- E. ASTM D2859 – Standard test method for flammability of finished textile floor covering materials.
- F. ASTM E303 – Standard test method for measuring surfacing frictional properties using the British Pendulum tester.
- G. ASTM F1292-18 – Standard specification for impact attenuation of surface systems under and around playground equipment.
- H. ASTM F1951 – Standard specification for determination of accessibility of surface systems under and around playground equipment

**1.6. SUBMITTALS**

- A. The Contractor shall submit complete sets of the material submittals, as required, including manufacturer's name and address, specific trade names, catalog and model numbers, illustrations and descriptive material, and samples of the proposed material for this project clearly marked as to proposed items for approval by the Owner's representative.
- B. Products submitted as equal must include hard copies of manufactures written specifications, warranty and proof of materials.
- C. Manufacturer's descriptive data and installation instructions.
- D. Manufacturer's details showing depths of wear course and sub-base materials, anchoring systems and edge details.
- E. Upon request, a listing of at least five installations where products similar to these proposed for use have been installed and have been in service for a minimum period of three years. The list shall include owner or purchaser, address of installation, date of installation, contact person, and phone number.
- F. A signed statement by an authorized official certifying that the surfacing system meets the requirements of ASTM F1292-18, section 15 for a head-first fall from the highest accessible portion of the specified playground equipment.
- G. A signed statement from the manufacturer of the poured in place surfacing attesting that all materials under this section shall be installed only by the Manufacturer's Trained Installers.
- H. A Certificate of Insurance shall be provided by the Manufacturer for poured in place surfacing for use as playground safety surfacing, covering general and product liability, of not less than \$1,000,000 for each occurrence, \$2,000,000 general aggregate, with an excess/umbrella liability of \$25,000,000. The issuing underwrite shall be AA rated.
- I. IPEMA Certification mandatory

**1.7. DELIVERY, STORAGE AND HANDLING**

- A. Materials and equipment shall be delivered and stored in accordance with the manufacturer's recommendations

**1.8. PROJECT CONDITIONS**

- A. Poured in Place surfacing must be installed on a dry sub- surface, with no prospect of rain within the initial drying period, and within the recommend temperature range of the manufacturer. Installation in weather condition of extreme heat, cold (less than 55°F), and/or high humidity may affect cure time, and the structural integrity of the final product. Immediate surrounding sites must be reasonably free of dust conditions or this could affect the final surface look.

**1.9. SEQUENCING AND SCHEDULING**

- A. Poured in Place surfacing shall be installed after all playground equipment, shade structures, signs and any other items that will be within the surfacing area.

**1.10. WARRANTY**

- A. Poured in Place surface shall maintain required impact attenuation characteristics and be guaranteed against defects in workmanship AND material for a limited seven-year period or as specified and agreed upon per alternate contract.

**PART 2 - MATERIALS**

**2.1. MANUFACTURER(S)**

- A. Manufacturers meeting the specifications will be accepted. Basis of design for the safety surfacing is Robertson Industries Inc., manufactured and installed by Robertson Industries Inc., or it's Certified Installers. Telephone: (800) 858-0519.
- B. Safety surfacing shall consist of both recycled and synthetic materials meeting the requirements of this specification.
- C. Wear Course - EPDM Granules
  - 1. Manufacturers: Gezolan
  - 2. As Distributed by: Robertson Industries Inc. (800) 858-0519
  - 3. Location Used: Playground Area
- D. Attenuation cushion layer Robertson Industries Inc. 100% SBR Buffings
  - 1. As Distributed by: Robertson Industries Inc. (800) 858-0519
  - 2. Location Used: Playground Area
- E. Binder – Aromatic VORAMER MR Products
  - 1. Manufacturer: DOW Chemical
  - 2. As Distributed by: Robertson Industries Inc. (800) 858-0519
  - 3. Location Used: Playground Area

**2.2. MATERIAL**

- A. Poured in Place Surface:
  - 1. The poured in place surface shall consist of recycled rubber mixed with a polyurethane binder, then capped with EPDM mixed with an aromatic binder.
  - 2. It shall consist of a uniform material manufactured in such a way that the top portion meets the requirements specified herein for wear surface.

3. The type of safety surfacing shall be a poured-in-place system and shall be indicated on the drawings.

**B. ATTENUATION CUSHION LAYER SECTION**

1. Impact attenuation cushion layer consists of 100% Robertson Industries Inc. Buffings.
2. Binder shall be between 7-12% of the total weight of the material and shall provide 100 % coating of the particles.

**C. WEAR COURSE**

1. Wear course shall consist of Ethylene Propylene Diene Monomer (EPDM) granules with polyurethane binder formulated to produce an even, uniform, seamless surface. Installation of surfacing shall be seamless (unless otherwise agreed upon by owner).
2. EPDM shall be peroxide cured with an EPDM content of 26% and shall include a processing aid to prevent hardness with 26% poly content to maintain dynamic testing characteristics, weatherization and UV stability.
3. ASTM D2240 (Shore A) hardness of 55-65, not less than 26 percent rubber hydrocarbons.
4. Size of EPDM granules shall be 1-4mm across. Binder shall be not less than 20% of total weight of rubber used in the wear surface and shall provide 100% coating of the particles.
5. Thickness of wear course shall be a minimum .75" (19.05 mm).
6. The wear course shall be porous.

**D. BINDER**

1. No Toluene Diphenyl Isocyanate (TDI) shall be used.
2. No filler materials shall be used in urethane such as plasticizers and the catalyzing agent shall contain no heavy metals.
3. Weight of polyurethane shall be no less than 8.5 lbs. /gal (1.02 Kg/1) and no more than 9.5 lbs. /gal (1.14 Kg/1).
4. Manufacturer is permitted to modify the type of urethane required to match extreme weather conditions. Substitutions must be equal to or exceed original quality.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

**A. Finished Grade/Slope:**

1. Verify that finished elevations or adjacent areas are as indicated on the architectural or site plans, that the appropriate sub-grade elevation has been established for the safety

surface to be installed, and that the subsurface has been installed per architectural, site or equipment plans while meeting accessibility and use zones requirements.

- B. Aggregate Subbase:
  - 1. Tolerance of aggregate sub-base shall be within .5" in depth. Verify that aggregate sub-base has been fully compacted.
- C. Per ADA Guidelines:
  - 1. compacted Aggregate sub-base – 4" of .75" minus irregular stone with fines compacted to 95% in 2" watered lifts.

### **3.2. PREPARATION**

- A. For poured in place safety surfacing, a Manufacturer's representative who is experienced in the installation of playground safety surfacing shall be provided.
- B. The representative shall supervise the installation to ensure that the system meets the impact attenuation requirements as specified herein.

### **3.3. INSTALLATION**

- A. Poured in Place Surfacing: Components of the poured in place surfacing shall be mixed on site in a rotating tumbler to ensure components are thoroughly mixed and are in accordance with manufactures recommendations. Installation of surfacing shall be seamless up to 2,000 square feet per day. Material shall cover all foundations and fill around all elements penetrating the surface.
- B. Attenuation Cushion Layer: Whenever practical, attenuation cushion layer of surfacing material shall be installed in one continuous pour on the same day of up to 2,000 square feet. When a second pour is required, step the seam (see detail) and fully coat the step of the previous work with polyurethane binder to ensure 100% bond with new work. Apply adhesive in small quantities so that new attenuation cushion layer can be placed before the adhesive dries.
- C. Wear Course: Wear course must be quality peroxide cured EPDM granules. Wear surface shall be bonded to attenuation cushion layer. If necessary, additional primer will be used between the attenuation cushion layer and Wear course. Apply adhesive to attenuation cushion layer in small quantities allowing the Wear course to be applied before adhesive dries. Surface shall be hand troweled to a smooth, even finish. Expect continuous and seamless up to 2,000 square feet per day (contact sales representative for seamless in excess of 2,000 square feet). Where seams are required due to color change, size or adverse weather, a step configuration will be constructed to maintain Wear course integrity. The edge of initial pour shall be coated with adhesive and wearing surface mixture shall be immediately applied. Pads with multiple seams are encouraged to include a top-coat of urethane before being placed into use. Butt joint seams are not acceptable except for repairs. Under special conditions and with Owners written approval seams may be permitted in same color pad. Consult with Manufacturer for specific applications.
- D. Thickness: Construction methods such as the use of measured screeds or guides shall be employed to ensure that the full depth of specified surfacing material is installed. Surfacing



system thickness throughout the playground equipment use zone shall be as required to meet the impact attenuation requirements specified herein.

**3.4. CLEAN UP**

- A. Manufacturer installers shall work to minimize excessive adhesive on adjacent surfaces or play equipment. Spills of excess adhesive shall be promptly cleaned.
- B. The site shall be kept clean and free of tools, trash, and debris and installation materials daily. Products may be stored on site during installation with appropriate protective measures and approval by the Owner's representative.

**3.5. MAINTENANCE**

- A. Maintenance requirements of the product as pertaining to general product maintenance to preserve the longevity of the product as well as any Warranty related requirements shall be presented to the owner in the closeout documentation.

**3.6. PROTECTION**

- A. Protect product during all construction activities until final project inspection and acceptance. Damage to product prior to acceptance may require replacement at no cost to the owner.

**END OF SECTION**

## **DECORATIVE METAL FENCES AND GATES**

### **SECTION 32 31 19**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the welded ornamental steel fence system defined herein at the Kid Mason Center.

##### **1.2. RELATED SECTIONS**

- A. Section 33 20 00 Earth Moving
- B. Section 32 13 13 Concrete Paving

##### **1.3. DEFINITIONS**

##### **1.4. QUALITY ASSURANCE**

- A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

##### **1.5. REFERENCES**

- A. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM B117 Practice for Operating Salt-Spray (Fog) Apparatus.
- C. ASTM D523 Test Method for Specular Gloss
- D. ASTM D714 Test Method for Evaluating Degree of Blistering in Paint.
- E. ASTM D822 Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- F. ASTM D1654 Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
- G. ASTM D2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- H. ASTM D2794 Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- I. ASTM D3359 Test Method for Measuring Adhesion by Tape Test.
- J. ASTM F2408 Ornamental Fences Employing Galvanized Steel Tubular Pickets.

**1.6. SUBMITTALS**

- A. The manufacturer’s literature shall be submitted prior to installation.

**1.7. DELIVERY, STORAGE AND HANDLING**

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

**1.8. WARRANTY**

- A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.
- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

**PART 2 - MATERIALS**

**2.1. MANUFACTURER(S)**

- A. The fence system shall conform to Montage Plus standard picket space Welded and Rackable Ornamental Steel, Majestic design, flush bottom rail treatment, 3-Rail style manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.

**2.2. MATERIAL**

- A. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.60 oz/ft2 (184 g/m2), Coating Designation G-60.
- B. Material for pickets shall be 3/4” square x 18 Ga. tubing. The rails shall be steel channel, 1.5” x 1.4375” x 14 Ga. Picket holes in the rail shall be spaced 4.675” o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 1 or the size on the drawings, whichever is larger.

<b>Table 1 – Minimum Sizes for Montage Plus Posts</b>		
<u>Fence Posts</u>	<u>Panel Height</u>	
2-1/2” x 16 Ga.	Up to & Including 6’ Height	
<u>Gate Leaf</u>	<u>Gate Height</u>	
	<u>Up to &amp; Including 4’</u>	<u>Over 4’ Up to &amp; Including 6’</u>
Up to 4’	2-1/2” x 14 Ga.	3” x 12 Ga.
4’1” to 6’	3” x 12 Ga.	3” x 12 Ga.
6’1” to 8’	3” x 12 Ga.	4” x 12 Ga.

**2.3. FABRICATION**

- A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture.
- C. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar’s proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).
- D. The manufactured panels and posts shall be subjected to an inline electrode position coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat.
- E. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm).
- F. The color shall be Black.
- G. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).
- H. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Commercial weight fences under ASTM F2408.
- I. Gates with an out to out leaf dimension less than and including 72 inches shall be fabricated using Montage Plus ornamental panel material and 1-3/4” sq. x 14ga. gate ends.
- J. Gate leafs greater than 72 inches shall be fabricated using ForeRunner rails, 17 gauge pickets, intermediate uprights, gussets and 1-3/4” sq. x 14ga. gate ends.
- K. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.

<b>Table 2 – Coating Performance Requirements</b>		
<u>Quality</u>	<u>ASTM Test Method</u>	<u>Performance Requirements</u>
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8” coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625” ball).
Weathering Resistance	D822 D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

**PART 3 - EXECUTION**

**3.1. PREPARATION**

- A. All new installation shall be laid out by the contractor in accordance with the construction plans.

**3.2. FENCE INSTALLATION**

- A. Fence post shall be spaced according to Table 3, plus or minus 1/4". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade.
- B. Fence panels shall be attached to posts with brackets supplied by the manufacturer.
- C. Posts shall be set in grouted core drilled continuous concrete footers as shown on the design drawings.
- D. The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer.

<b>Table 3 – Montage Plus – Post Spacing by Bracket Type</b>						
Span	8' Nominal (91.95" Rail)					
Post Size	2-1/2"	2-1/2"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Montage Plus Universal (BB112)	Montage Plus Line Blvd. (BB114)	Montage Plus Flat Mount (BB111)		Montage Plus Swivel (BB113)*	
Post Settings ± 1/4" O.C.	95"	95"	95"	95-1/2"	*95"	*95-1/2"
*Note: When using BB113 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel.						

**3.3. GATE INSTALLATION**

- A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
- B. Type and quantity of gate hinges shall be based on the application, weight, height, and number of gate cycles.
- C. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application.
- D. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

### **3.4. MAINTENANCE**

- A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces;
  - 1. Remove all metal shavings from cut area.
  - 2. Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry.
  - 3. Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate manufacturer's warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces.
  - 4. Paint pens provided by the manufacturer to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

### **3.5. CLEANING**

- A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

### **3.6. PROTECTION**

- A. Protect finish during all construction activities until final project inspection and acceptance. Damage to finish may require replacement at no cost to the owner.

**END OF SECTION**

## **SITE BIKE RACKS**

### **SECTION 32 33 13**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. This section includes specifications for the Swerve Bike Rack.
  - 1. Bikes parked per unit: 2

##### **1.2. QUALITY ASSURANCE**

- A. Installer Qualifications:
  - 1. An experienced installer who has completed installation of bicycle racks similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications:
  - 1. A firm experienced in manufacturing bicycle racks similar to those required for this project and with a record of successful in-service performance.
- C. Source Limitations:
  - 1. Obtain each color, finish, shape and type of bicycle rack from a single source with resources to provide components of consistent quality in appearance and physical properties.
- D. Product Options:
  - 1. Drawings indicate size, shape and dimensional requirements of bicycle racks and are based on the specific system indicated.

##### **1.3. SUBMITTALS**

- A. If an alternate manufacturer or product is proposed, the submittal shall also include pre-approval from the City's Urban Design Coordinator.
- B. Product Data: Include physical characteristics such as shape, dimensions, bicycle, material parking capacity and finish for each bicycle rack.
- C. Shop Drawings: Show installation details for each bicycle rack.
- D. Samples for Verification: Submit finish samples for review and verification.
- E. Maintenance Data: For each bicycle rack.
- F. Include recommended methods for repairing damage to the finish.

**1.4. DELIVERY, STORAGE AND HANDLING**

- A. Upon delivery, before signing for shipment, inspect for any damages and notate on the B.O.L.
- B. Store bicycle racks in original undamaged packages and containers until ready for installation. Handle bicycle racks with sufficient care to prevent any scratches or damage to the finish.

**1.5. PROJECT CONDITIONS**

**1.6. WARRANTY**

- A. Contractor shall provide owner with proof of sale from Dero or from an approved dealer.
- B. Manufacturer will warrant its products against defects in workmanship and materials for a period of (12) months from the date of delivery for all products.
- C. Contractor shall be responsible for repair or replacement at its own expense.

**PART 2 - MATERIALS**

**2.1. MANUFACTURER(S)**

- A. Items in this section are specified by the City of Tampa ordinance.

If a substitution is proposed, the contractor, at its own expense shall obtain in writing, approval from the Urban Design Coordinator in the Development Coordination Division of the City of Tampa's Development & Growth Management Department.

- B. Provide bicycle racks manufactured by:

- 1. DERO BIKE RACK CO.  
5522 Lakeland Avenue N.  
Minneapolis, MN 55429  
1-888-337-6729  
Fax: 612-331-2731  
Website: www.dero.com

**2.2. MATERIAL**

- A. 1.5" schedule 40 uncoated pipe (1.90" OD)
- B. Installation Methods:
  - 1. In-ground mount is embedded into concrete base.

**2.3. FINISHES**

- A. Color: Black
- B. High quality TGIC powder-coated as available from Dero Bike Rack Co.
  - 1. Part is prepared for painting with hard sandblasting.



2. An epoxy primer is electrostatically applied.
3. A final TGIC, UV resistant polyester powder coat is applied.
4. Final coating mil thickness shall be no less than 6 mils.

**PART 3 - EXECUTION**

**3.1. INSTALLATION**

- A. Installation Method
  1. In ground mount

**3.2. MAINTENANCE**

- A. Provide owner with current maintenance requirements as provided by the manufacturer.

**3.3. PROTECTION**

- A. Protect finish during all construction activities until final project inspection and acceptance. Damage to finish may require replacement at no cost to the owner.

**END OF SECTION**

# SITE TRASH AND LITTER RECEPTACLES

## SECTION 32 33 23

### PART 1 - GENERAL

#### 1.1. DESCRIPTION OF WORK

- A. This section includes the following:
  - 1. Receptacle (Model 84)

#### 1.2. QUALITY ASSURANCE

- A. Installer Qualification: An experienced installer who has completed installation of site furnishings and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: Experienced site furniture manufacturer since 1984.

#### 1.3. SUBMITTALS

- A. Product Data: Include physical characteristics such as shape, dimensions and finish for each bench.
- B. Shop Drawings: Provide installation details for each product.
- C. Samples for Verification: For the following product, show the color of the powder coat finish.
- D. Maintenance Data:
  - 1. Provide recommended methods for repairing damage and abrasions to the powder coat finish.

#### 1.4. DELIVERY, STORAGE AND HANDLING

- A. Store products in original undamaged packaging in a dry location until ready for installation.
- B. Handle powder coated products with care to prevent any damage to the finish

#### 1.5. WARRANTY

- A. Manufacturer Supplied Limited twenty-year warranty against structural failure of all steel litter receptacle frames.

### PART 2 - MATERIALS

#### 2.1. MANUFACTURER(S)

- A. Items in this section are specified by the City of Tampa ordinance.

If a substitution is proposed, the contractor, at its own expense shall obtain in writing, approval from the Urban Design Coordinator in the Development Coordination Division of the City of Tampa's Development & Growth Management Department.

B. Provide products from the following manufacturer:

DuMor Inc.  
138 Industrial Circle  
Mifflintown, PA 17059  
Phone: 800-598-4018  
Fax: 717-436-9839  
Email: [sales@dumor.com](mailto:sales@dumor.com)  
Website: [www.dumor.com](http://www.dumor.com)

**2.2. MATERIAL**

A. Receptacle Body 32 Gallon

1. Receptacle body shall be manufactured from 3/8" x 1 1/4" ASTM A36 carbon steel flat bar, 3/8" x 1 1/4" ASTM A36 carbon steel flat bar, 1/4" x 3" ASTM A36 carbon steel flat bar, 5/8" diameter ASTM A36 steel round bar and 1/4" thick ASTM A36 steel plate.

B. Cover:

1. Cover shall be manufactured from 14-gauge ASTM A1011 steel plate.

C. Liner:

1. Liner shall be HDPE with 32-gallon capacity.

D. Anchoring:

1. Stainless steel expansion anchors (1/2" x 3 3/4") as provided by manufacturer.

**2.3. DIMENSIONS**

A. 32-gallon receptacle

1. Overall: 32 1/2" diameter x 36 3/16" high

**PART 3 - EXECUTION**

**3.1. INSTALLATION**

- A. Handle and install receptacles according to manufacturer's recommendations and installation instructions.

**3.2. MAINTENANCE**

- A. Provide owner with current maintenance requirements as provided by the manufacturer.

**3.3. PROTECTION**

- A. Protect finish during all construction activities until final project inspection and acceptance. Damage to finish may require replacement at no cost to the owner.

**END OF SECTION**

## **UNDERGROUND SPRINKLERS**

### **SECTION 32 84 23**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. Furnish all materials, equipment and labor as necessary for the installation of an irrigation system per the drawings and specifications. All work should meet City of Tampa standards for materials and workmanship.
- B. Location of underground sprinkler system is shown on drawings if provided.
- C. Design and installation of system included in this section

##### **1.2. RELATED SECTIONS**

- A. Section 32 93 00: PLANTS

##### **1.3. QUALITY ASSURANCE**

- A. All work shall be installed by skilled personnel, proficient in the trades required, in a neat, orderly and responsible manner with recognized standards of workmanship.
- B. The Contractor shall have had considerable experience and demonstrated ability in the installation of sprinkler irrigation systems of this type.

##### **1.4. SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data for all materials and installation instructions for underground sprinkler system prior to starting work on the project site.

##### **1.5. WARRANTY**

- A. Guarantee: All work shall be guaranteed by contractor for one year from date of final acceptance against all defects and malfunctions in materials, equipment and workmanship and shall be included as a part of the project closeout document requirements.
- B. The guarantee shall also cover repair of damage to any part of the premises resulting from leaks or other defects in materials, equipment and workmanship, to the satisfaction of the City of Tampa. Repairs, if required, shall be done promptly at no cost to the City of Tampa. The contractor shall not be responsible for damage to the irrigation system by others. The guarantee shall state the name of the owner, provide full guarantee terms, effective and termination date, name and license number. It shall be signed by the chief executive of the contracting firm and notarized. Manufacturer's warranties shall not relieve the contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.
- C. The contractor shall make necessary repairs within 72-hours notice. If the Contractor neglects to make or undertake the repairs with the due diligence, the City of Tampa may make such repairs at the contractor's expense. In the case of an emergency where in the judgment of the City of Tampa, delay would cause loss or damage, repairs or replacement may be mad without notice being sent to the contractor and the contractor shall pay the cost thereof.

## **PART 2 - MATERIALS**

### **2.1. MANUFACTURER(S)**

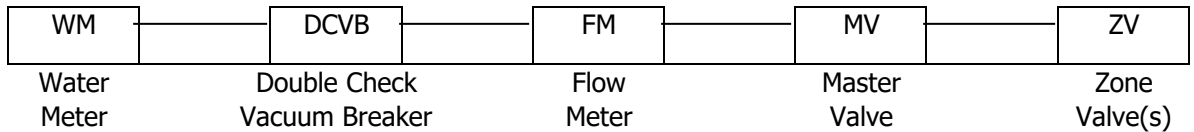
- A. Specific Manufacturer(s) listed in materials have been selected as a standardization by the City of Tampa Parks & Recreation Department. Substitutions will not be allowed.

### **2.2. MATERIAL**

- A. Backflow Preventer: Top Ported – Double Check Vacuum Breaker sized to match the system and installed underground in a valve box of adequate size to ensure 2" of clearance of all valve handles.
- B. Irrigation Pipe: All main and lateral lines shall be PVC pipe ASTM D1785 1120 Schedule 40. Exception would be galvanized steel pipe, when specified, and if exposed paint with 2 coats of forest green enamel
  - 1. Pipe Size: Increased to allow expansion or nozzle size change.
    - a. No flow shall exceed 4' per second.
    - b. All laterals to heads will be 1" or larger on rotors and ¾" or larger on pop-ups, bubblers and Quick Couplers
    - c. Nozzle and zone size will be calculated to provide maximum precipitation rate to reduce watering time based on meter size.
    - d. No pipe smaller than ¾".
- C. Sleeving:
  - 1. Sleeving shall be installed for all hardscape surfaces including, but not limited to, sidewalks, courts, etc.
  - 2. Contractor to verify Schedule 40 PVC or HDPE unless noted on plans.
  - 3. Sleeve size shall be 2 times irrigation pipe size minimum.
  - 4. For all sleeves containing lateral pipe and wiring, all wire to be in its own conduit.
- D. Adhesives:
  - 1. All connections, 4" and less, shall be Weld-On PC-64 purple primer and Weld-On PVC 702 clear cement.
- E. Pipe Fittings:
  - 1. ASTM D 2466 socket fittings Schedule 40 shall be used for PVC pipe.
    - a. Put purple primer first, cement after.
  - 2. ANSI B 16.3 galvanized malleable iron screwed fittings shall be used for all galvanized pipe.
- F. Manual Valves:

1. Manufactured as follows: PVC Schedule 40 ball valves unless otherwise indicated.
- G. Quick Coupling Valve:
1. Standard is Rainbird #3RC with minimum lateral size  $\frac{3}{4}$ ".
  2. Ensure 2" of clearance of all valve handles.  
(See "Quick Coupling Valve Detail" for installation.)
- H. Electric Valves:
1. Irritrol 200B series electric valve with flow control.
- I. Automatic Valve Wiring: 14-gauge direct burial wire.
1. Color coded as follows:
    - a. Red for Irrigation zones;
    - b. Blue for master valve
    - c. Black for extras.
      - i. Two black extra wires to be run to the furthest valve from controller in each direction. Wire splices shall be made at a common location, contained in a valve box and spliced using greased filling King wire nuts.
  2. All wire to be brought to timer location with 6' pigtail to facilitate hook-up.
  3. Provide 12-gauge white common wire for any runs over 100'.
- J. Sprinkler Heads: Manufacturer's standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure and installed using K-flex pipe and Schedule 40 PVC connectors as follows:
1. Rainbird Bubbler: #1402 – 0.5 GPM on K-Flex pipe (2 per tree).
  2. Rainbird Pop-up: 1800 series with nozzle to match application (No PRS).
- K. Valve Box: Provide plastic valve box with cover, size as needed, or as specified on drawings. Place level on brick or stone blocks. Provide a minimum of 2" of #57 stone below exposed PVC pipes. Top of valve installed flushed with finished grade. Any valve placed in concrete must be concrete or double wall concrete rated plastic box.
- L. Computerized Irrigation Controller: Computerized irrigation controller and cabinet shall be supplied and installed by the City of Tampa.
1. Coordination of installation of the controller with the City of Tampa is required by the Contractor.
  2. Controller shall be a Motorola MIR System Ace, M or Piccolo, as shown on the drawings.
- M. Computerized Irrigation Equipment: The following is part of the computerized system and is the responsibility of the awarded contractor.

1. Computerized systems shall utilize a flow meter by Master Meter Inc. matched to the water meter size, with a 10 gallon pulse.
2. Wiring from flow meter to controller must be 14-2 Maxi-com cable. No splices should be made in the Maxi-com cable. Maxi-com to be run under main line or in conduit.
3. Power source at timer should be A/C.



- N. Water Source: To be connected to the existing irrigation meter as shown on the plans.

### **PART 3 - EXECUTION**

#### **3.1. EXAMINATION**

#### **3.2. PREPARATION**

- A. A pre-construction meeting will occur on site prior to commencement of work.
- B. General: Contractor shall be responsible for filing and obtaining any and all agency permits as described. All work must conform to City of Tampa and the latest adopted plumbing code. Any work taking place along a city, county or state road or median must comply with appropriate regulating authority guidelines for Traffic Control for Construction and Maintenance Operations.

#### **3.3. INSPECTIONS**

- A. Required Inspections:
  1. Piping: prior to covering.
  2. All materials prior to planting and/or mulching.
  3. 24-hour notice of inspection required.
  4. Main lines require pressure tests of 50 PSI to be maintained for minimum of 1 hour.

#### **3.4. INSTALLATION**

- A. TRENCHING AND BACKFILLING:
  1. General: Protect existing utilities, paving, plants, trees and other facilities caused by irrigation operations. Contractor shall be responsible for the repair of any damage to existing utilities and paving. Excavate straight and true with bottom uniformly sloped to low point.
  2. Sunshine: Contractor shall be responsible for notifying underground utilities 48 hours prior to beginning work (800) 432-4770. No site work shall commence until all underground utilities have been properly located and identified.

3. Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1" diameter. Place acceptable backfill material in 6" lifts, compacting each lift.
4. Existing Lawns or planting beds: Where trenching is required across existing lawns or planting beds, trench no wider than necessary to accommodate pipes.
  - a. Backfill trench to within 6" of finished grade. Continue fill with acceptable topsoil and compact to bring area to the elevation of existing lawn OR PLANTING BED.
  - b. If trench is more than 6" in width, relay or plant new sod within 7 days after removal, roll and water generously.
  - c. Restore to original condition any sod areas not in healthy condition equal to adjoining lawns 30 days after planting.
5. Existing Trees: All efforts shall be made to avoid trenching under the driplines of existing trees and canopy spread of proposed trees. All proposed trenching or other work under the limb spread of any and all trees shall be done by hand so that no limbs or branches or roots are damaged in any way.
  - a. Trenching shall comply with Chapter 13-146, Technical Manual and shall be done to minimize root disturbance. City of Tampa representative shall be present prior to beginning work, to determine limits of root pruning and shall approve any work taking place within protective radius of trees. All tree roots shall be severed cleanly per the Chapter 13 of the City Code.
6. Protective radius schedule per Chapter 13 of the City Code reads as follows:
  - a. 1" caliper – no trenching within 4' of tree trunk
  - b. 6" – 14" caliper – no trenching within 6' of tree trunk
  - c. 15" – 34" caliper – no trenching within 15' of tree trunk
  - d. 34" and greater – no trenching within 20' unless approved by City Representative
7. Pavements:
  - a. Boring is the preferred method. Open cuts must be approved by City Representative. Where existing pavements must be crossed to install landscape irrigation system, saw cut straight clean lines 6" wider than trench.
  - b. Excavate trench to required depth and width.
  - c. Remove cut out pavement and excavated material from the site.
  - d. Backfill with dry sand fill material, placing in 6" lifts to meet City of Tampa compaction requirements.
  - e. Repair or replace pavement cuts with equivalent materials and finishes.



- f. If a concrete sidewalk is cut or damaged, the full section must be replaced.
  - g. Piping under hardscape that is 5' wider or greater shall be sleeved.
  - h. Contractor is responsible for daily clean-up of operations to include debris, directional bore slurry and any hydraulic fluids.
8. Backflow Preventer: Top ported DCVB installed underground in a rectangular valve box with 6" gravel sump. Box of adequate size for easy testing access.
9. Control Valves: Install in valve box. Arrange in box for easy adjustment and removal.
- a. If needed, adjust size of automatic control valves to provide flow rate of rated operating pressure required for each sprinkler zone.
  - b. All zone wiring and Maxi-com cable to be installed under the main line or in conduit. Wiring that shares a sleeve with irrigation water lines shall be contained in its own conduit.
10. Provide 18" of straight uninterrupted PVC pipe in front of the Master Meter and 12" of straight behind.
11. Piping: Lay pipe on solid sub-base uniformly sloped.
- a. Install PVC pipe in dry weather when temperature is above 40 degrees F in strict accordance with manufacturer's instructions. Allow joints to cure at least 24 hours at temperatures above 40 degrees F (4 degrees C) before testing, unless otherwise recommended by manufacturer. All PVC connections will be cleaned with purple primer prior to cementing.
  - b. Mainline depth shall be 18".
  - c. Lateral line depth shall be 12".
  - d. Sprinkler Heads: Flush circuit lines with full pressure and install nozzles after hydrostatic test is completed.
    - i. Install all heads at manufacturer's recommended heights.
    - ii. 3.4.8.2 Locate part-circle heads to maintain a minimum distance of 3" from curbs, hardscape and structures.
    - iii. 3.4.8.3 After completion of grading, seeding or sodding, and rolling of the grass areas, carefully adjust lawn sprinkler heads so they will be flush with grade.
    - iv. Pop-ups installed on 1/2" flex hose using Schedule 40 PVC connectors.
    - v. Rotors to be installed on appropriate size flex hose using Schedule 40 PVC connectors. Ensure sprayer rotor water does not directly contact existing structures or hardscape areas.
  - e. Dielectric Protection: Use dielectric fittings at connection where pipes of dissimilar metal are joined.

- f. Wiring: All wiring shall be performed by the contractor as shown on drawings. All wiring shall be run from point of connection back to the controller. Provide 6' pig tail.
- g. Quick Coupler Valves: Build and install per details on construction drawings. Valve box shall be adequately sized and installed so as not to interfere with the operation of the quick coupler key.

### **3.5. MAINTENANCE**

- A. Contractor is responsible for all maintenance of the system until final acceptance by City Representative and for the maintenance period specified in section Plants.

### **3.6. ACCEPTANCE**

- A. Final Inspection: The inspection of irrigated areas will be made by the City Representative upon contractor's request.
  - 1. Provide notification at least 2 working days prior to inspection.
  - 2. The City Representative will provide a punch list of those items which must be corrected before re-inspection for final acceptance.
  - 3. The City Representative will set an appropriate time period in which the punch list items must be corrected.
  - 4. System to be run through electronically of all zones to ensure all components are working properly.
- B. Final Acceptance
  - 1. System to be run through City programming for one week prior to final acceptance.
  - 2. As Built drawings: At project closeout, the Contractor shall submit complete electronic drawings showing any changes from approved shop drawing. These shall be included as part of required As-Built/Record Drawing requirement of the general provision.
    - a. As-built drawings shall include the following:
      - i. Irrigation system as installed.
      - ii. Water source location and size.
      - iii. Power source location.
      - iv. Changes to controller type or location.
      - v. Changes in type or location of flow meter or master valve.
      - vi. Any wiring changes in location, number, type, color.
      - vii. Valve locations should be dimensioned, and areas controlled identified.

**END OF SECTION**

**PLANTS**  
**SECTION 32 93 00**

**PART 1 - GENERAL**

**1.1. DESCRIPTION OF WORK**

- A. Furnish all materials, transportation, equipment and labor necessary for installation of specified plant material, incidental work, and accessories including soil preparation and grading as further described on the drawings and throughout this section.
- B. Work includes protection of existing facilities, control of the job site, erosion control, and traffic management.
- C. Obtain all applicable permits prior to beginning work.

**1.2. SECTION INCLUDES**

- A. Plant material
- B. Soil amendments & preparation
- C. Tree and palm stabilization.

**1.3. RELATED SECTIONS**

- A. Section 32 91 13 Soil Preparation
- B. Section 32 92 00 Turf and Grasses
- C. Section 32 84 23 Underground Sprinklers

**1.4. DEFINITIONS**

- A. Establishment Period: Critical timeframe for plant establishment begins when plant material is installed and continues for [90 days, 12 weeks, 6 months, 1 year] after Installation Acceptance. May be combined with Maintenance Period if included and concurrent.
- B. Installation Acceptance: Written acceptance of plant material and associated improvements; provided by City Representative upon Awardee request and when plant material and associated improvements comply with the plans and specifications. See Item 3.6 – ACCEPTANCE for additional information.
- C. Florida Grades and Standards: "Florida Grades and Standards for Nursery Plants," latest edition, as published by the Florida Department of Agriculture.
- D. Maintenance Acceptance: Written acceptance of plant material and associated improvements at the end of the Maintenance Period; provided by City Representative, contingent upon inspection. See Item 3.6 – ACCEPTANCE for additional information.
- E. Maintenance Period: Timeframe during which the installing contractor is responsible for maintenance of the installed plants and surrounding areas. Beginning at Installation Acceptance and continuing for [90 days, 6 months, 1 year] until Maintenance Acceptance.

- F. Transplanted Material: Existing plants relocated on the project site or plants collected from off-site and relocated to the project site. These are plants that have not been grown or reestablished in a nursery setting.

### **1.5. QUALITY ASSURANCE**

- A. The landscape installation shall be by a single firm specializing in landscape work.
- B. The City Representative may reject any work that does not meet the requirements of the project drawings or specifications. Work may be rejected at any point during the contract from beginning of work through Maintenance Acceptance. Rejected work shall be corrected prior to the next acceptance review (Installation or Maintenance Acceptance).
- C. See PART 2 – PRODUCTS for quality of plants, accessories, and other incidental material.
- D. Do not make substitutions. If specified material is not obtainable, submit proof of non-availability and proposed substitute to City Representative. If a substitute is approved, contract amount may be revised.
- E. The City Representative may inspect and approve all trees at the place of growth prior to purchase.
- F. Trees shall be tagged, or blocks identified, at the source of supply prior to inspection by City Representative.
- G. If trees and palms are not inspected at the place of growth, then the Awardee shall submit photographs per Item 1.6 – SUBMITTALS.

### **1.6. REFERENCES**

- A. FDOT Standard Plans 102-600 to 661 "Traffic Control through Work Zones"
- B. Florida Erosion and Sediment Control Manual

### **1.7. SUBMITTALS**

- A. Make all submittals prior to commencing work with enough time for review and approval or as specifically required in subsequent items.
- B. Submit overall work schedule at least 2 weeks before beginning work.
  - 1. Schedule may have a range of possible start/end dates, but the City Representative shall be notified a minimum of 1 week before beginning any phase of work (e.g. soil preparation, irrigation, planting).
  - 2. Submit revised schedule as necessary.
- C. Submit soil test reports and recommendations. See Item 3.3 – PREPARATION for additional information. Delete if covered by another section or not necessary for project.
- D. Submit certificates of inspection for plant material when required by the Florida Department of Agriculture.
- E. Submit manufacturers' certified analysis for soil amendments, herbicides, insecticides and fertilizer materials.

- F. Submit Plant Material Photos at least 2 weeks prior to delivery:
  - 1. Trees and Palms: Submit photo of actual trees to be installed.
  - 2. Shrubs, Grasses, Ground Covers, and Vines: Submit representative photos depicting the [typical, minimum] size and quality of each species and variety.
  - 3. Photos shall be submitted digitally, reasonably sized, in focus, and include a measuring device.
  - 4. The City Representative may reject any plants that do not match the photos submitted or do not meet the variety, quality, size specified.
  - 5. The City representative may reject plants that have been damaged during delivery, installation, or other work regardless of prior approval.
  - 6. The City Representative may choose to review plants at the nursery/farm in addition to, or in lieu of, reviewing photos.
- G. Submit the following material samples and source information at least 2 weeks prior to delivery:
  - 1. Mulch (organic and mineral), 1 quart of each type specified.
  - 2. Topsoil with verification of sterilization and source, 1 quart.
  - 3. Samples are not necessary if City Representative accepts material based on source and product data provided by Awardee.
- H. Submit receipts and empty bags/containers of mycorrhizal inoculant product.
- I. Submit product data and warranty information for all products that will be part of the finished work including any proprietary tree stabilization systems.
- J. Submit maintenance recommendations to supplement City standards for maintenance during the Warranty Period.
- K. Submit As-Built Drawings:
  - 1. Drawings shall be submitted digitally per the general conditions of the contract.
  - 2. Legibly mark drawings to record actual installation locations and details.
  - 3. Include dimensions where necessary to communicate actual locations.
  - 4. Include reason for deviation from plans such as utility conflicts or Owner directive.

**1.8. DELIVERY, STORAGE AND HANDLING**

- A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.

- B. B&B Trees must be held and fully acclimatized over a period not less than eight (8) weeks prior to delivery to site.
- C. Take all precautions customary in good trade practice in preparing plants for moving. Damaged or stressed plants may be rejected.
  - 1. The use of "anti-desiccants" may be acceptable based on product and application method; review with City Representative prior to applying products.
  - 2. Dig, pack, transport, and handle plants with care to ensure protection against injury.
- D. Certificates of Inspection required by the Florida Department of Agriculture shall accompany each shipment invoice or order. Upon arrival the certificate shall be filed with the appropriate City of Tampa Department.
- E. Protect all plants from drying out. Install plants immediately upon delivery or protect from drying by irrigation and/or insulation as necessary.
- F. No plant shall be bound with rope or wire in a manner that could damage or break the branches.
- G. Plant material that is stored improperly may be rejected.
- H. Cover plants transported on open vehicles with to prevent wind burn.
- I. Topsoil shall be kept dry and loose for planting bed mixes.
- J. Label at least one (1) tree and one (1) shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.

**1.9. PROJECT CONDITIONS**

- A. Review existing project site conditions and proposed material quantities before submitting proposal/bid. Notify City Representative of any material discrepancies or site conditions that will affect proposal or work.
- B. Contact Sunshine One Call (811) a minimum of 72 hours before beginning work. Verify all underground and above grade utilities prior to start of work. Mark underground utility locations.
- C. Examine sub-grade and existing elevations before beginning other work.
- D. Notify City Representative of any utility conflicts or adverse conditions before starting work. Start of work will indicate acceptance of existing conditions.
- E. Locate, protect, and maintain the existing irrigation system during planting operations. Repair irrigation system components, new and existing, damaged during planting operations with like materials. Test system prior to installation of plant material.

**1.10. WARRANTY**

- A. Contractor agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
  - 1. Failures include, but are not limited to, the following:

- a. Death, unsatisfactory growth, unhealthy condition, or unsightly appearance, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
    - i. Unsatisfactory growth shall mean any plant that does not meet the originally specified quality (e.g. Florida No. 1).
    - ii. Unhealthy condition shall mean any condition, infection, or infestation affecting the immediate or long-term health of the plant resulting from the Awardee's negligence.
    - iii. Unsightly appearance will generally be based on Florida Grades and Standards but may also be evaluated based on the project specifications, and reasonable expectations of plant species/variety and site conditions.
  - b. Structural failures include complete failure (e.g. falling, splitting, leaning) or failures of parts such as broken limbs or compromised roots.
2. Warranty Period: [12] months from date of Installation Acceptance.
3. Include the following remedial actions as a minimum:
- 4.
- a. Reset trees and palms that have shifted out of plumb.
  - a. Reset plants that have settled below finish grade or root ball elevation specified herein or on project drawings.
  - b. Remove and replace dead or unsatisfactory plants within 4 weeks of identifying failure or receipt of written request from City Representative unless restricted by site conditions, weather, or season; remediate as soon as conditions permit.
  - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
  - d. Provide extended warranty for period equal to half of original warranty period, for replaced plant material.
  - e. Warranty Exclusions: Failures caused by fires, floods, rains, lightning storms or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the owner.
  - f. Final Acceptance: The City Representative, or designee, will inspect the project at the end of the Warranty Period.

**PART 2 - MATERIALS**

**2.1. PLANT MATERIAL**

A. Plant Names:

- 1. Provide plant species and varieties as listed on the project drawings (plant schedule).

2. Scientific names are based on the International Plant Name Index. Notify City Representative of any nomenclature discrepancies or confusion that may cause mistakes when procuring plants.
  3. Provide stock true to botanical name and legibly tagged.
- B. All plant material shall be graded "Florida No. 1" per Florida Grades and Standards unless otherwise noted on the drawings.
- C. Caliper measurement shall be taken 6" above ground level if 4" or less. If greater than 4", caliper measurement will be taken at 12" above ground level per Florida Grades & Standards.
- D. All plants shall be nursery grown. Nursery grown material shall also include plants that have been collected (e.g. cabbage palms) and reestablished under professional care in a nursery.
1. Field grown or container grown stock will be specified on the drawings.
  2. Root ball and container sizes shall be per Florida Grades and Standards.
  3. Field grown stock shall be hardened-off and properly prepared for transplant per Florida Grades and Standards [specify Roots Plus Grower here if desired].
  4. Field grown stock shall be properly prepared for transplant (i.e. "hardened off), with new root growth visible. Root ball shall be secure enough to successfully transplant including burlap, wire, or other binding as necessary.
  5. See Part 3 – EXECUTION for installation including removal of root ball binding.
- E. Specified Plant Sizes
1. When only a minimum plant size is provided on the drawings, all stock provided shall meet the minimum size.
  2. Plants that exceed the indicated size are acceptable at no additional cost. Larger plants shall not be cut back to the specified size unless the plant is part of a sheared hedge or topiary. Larger plants shall have roots in proportion to the increased size as described in the Florida Grades and Standards.
  3. Specified height and spread shall prevail over container size. Plants in larger containers shall be provided if necessary to meet the specified height and spread. Written approval is required to provide smaller containers.
  4. Tree height shall be measured from the top of the root ball to the average height of the top of the canopy. Height shall not be measured to a single leader or whip extending from the canopy.
- F. No pruning wounds shall be present with a diameter of more than one-inch (1") and such wounds must show vigorous bark on all edges.
- G. Any plant material showing signs of stress will be judged on a case by case basis for acceptance or rejection.
- H. Plants installed in rows shall be matched in form.

## **2.2. SOIL & AMENDMENTS**



- A. Planting Soil - 1 part native soil, 1 part topsoil. See Part 3 – EXECUTION and drawings for depth and extent of Planting Soil.
  - 1. Native (in-situ) Soil: soil existing on site excluding construction debris, muck, road base, and other non-viable or high pH (>8.0) material. Notify the City if there is inadequate native soil on site. The City may approve the use of additional topsoil or other amendments as a component of the Planting Soil.
  - 2. Topsoil: 55% sand, 25% silt, 10% compost, 5% clay, 5% pine bark fines; free of weeds and viable seedbank.
- B. Mycorrhizal Inoculant: A transplant amendment such as Diehard Transplant (or approved equal product) formulated to inoculate landscape trees and shrubs with live beneficial mycorrhizal fungi. Product shall include endo and ectomycorrhizal inoculants and other additives as necessary to facilitate the growth and viability of the fungi

### **2.3. FERTILIZERS**

- A. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen and potassium in amounts recommended in soil report.
- B. Fertilizer Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
- C. Size: [5-gram] [10-gram] [21-gram] tablets.
- D. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
- E. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.
- F. City of Tampa Ordinance No. 2012-48 bans the application of fertilizer containing nitrogen or phosphorous from June 1 through September 30.

### **2.4. HERBICIDES & PESTICIDES**

- A. Pre-emergent Herbicide: (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer
- B. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.
- C. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

### **2.5. MULCHES**

- A. Mulch shall be clean, bright and free from weeds, moss, sticks and other debris.
- B. Organic Mulch: Medium Pine Bark

- C. Mineral Mulch: Washed shell

## **2.6. TREE AND PALM STABILIZATION**

- A. Refer to project details.
- B. Proprietary systems may be used with City approval.

## **2.7. WATER**

- A. Water shall be free of substances harmful to plant growth. Water shall contain less than 300 ppm soluble salts and less than 10 ppm chlorine, fluoride and sodium. Hoses or other methods of transportation furnished by Awardee. Acceptable sources: deep wells, municipal potable supply and treated wastewater.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. Examine proposed planting areas and conditions for installation. See Item 1.9 – PROJECT CONDITIONS for additional requirements.
- B. Correct unsatisfactory conditions prior to plant installation.

### **3.2. PREPARATION**

- A. Time of planting.
  - 1. Deciduous material: If deciduous trees are planted in leaf, the City may accept the application of an anti-desiccant spray if recommended by the grower or installer. Review with City Representative prior to applying anti-desiccant / anti-transparent products.
  - 2. If planting or establishment period are within the hot, dry seasons, then additional irrigation may be necessary. Review with City Representative prior to installing plants.
  - 3. Cold-sensitive plants imported from warmer climates may require an acclimation period prior to installation and shall not be installed from December to February without written approval.
- B. Planting shall be performed by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.
- C. Site Preparation: Remove existing vegetation and other materials per the drawings or as needed to accommodate the proposed improvements.
- D. Bed Preparation: Excavate existing soil as necessary to accommodate soil amendments, plants, finish grades, and mulch.
  - 1. Ensure proper drainage prior to proceeding with soil amendment or planting; Notify City Representative of any conditions detrimental to plant growth discovered during excavation.
  - 2. Incorporate 6" of topsoil into 6" of native soil to create a 12" Planting Soil layer.

3. Incorporate slow release fertilizer per soil test recommendation, manufacturer instructions, and local ordinances.
    - a. Do not apply fertilizer containing nitrogen or phosphorous between June 1 and September 30 per City of Tampa Ordinance No. 2012-48.
    - b. Do not apply fertilizer containing phosphorous unless recommended by soil test report AND approved by City Representative.
  4. Apply preemergent and post-emergent herbicides as necessary to provide a weed-free planting medium; apply per manufacturer recommendations and federal, state and local requirements.
  5. Rough grade planting bed areas in preparation for planting so that finished grades can be achieved after plant installation.
- E. Tree Pit Preparation (when not included in planting beds): Tree pits shall be excavated and prepared per Item 3.4 – Installation.
- F. Tree Well Preparation: Prepare tree wells per plans and details; notify City Representative of any site conditions that may affect the installation of the tree well components or the success of the tree(s).
- G. Plant Layout:
1. Layout planting beds for review and approval by City Representative prior to plant installation.
  2. Stake tree locations for review and approval by City Representative prior to installation.
  3. Layout shrub and ground cover plants for review and approval by City Representative prior to installation.
  4. Give 48-hours notice of need for inspection.
  5. Notify City Representative if site conditions require plant material location adjustments after initial layout approval. Install plants only after City Representative has approved proposed location.
- H. Prepare planting areas and pits per drawings. Planting soil layer shall be prepared by combining native soil and approved topsoil at the ratio of 1:1.
- I. Incorporate mycorrhizal inoculant product into planting soil layer per manufacturer recommendation.

### **3.3. INSTALLATION**

- A. Install plants per project drawings and as follows:
1. Dig planting pit per project details; remove any deleterious material; compact sub-grade below root ball if necessary.
  2. Completely remove all containers, synthetic root ball wraps and binding; remove a minimum of 1/3 (top) of biodegradable root ball wraps (e.g. burlap).

3. Correct root ball as necessary for establishment and long-term plant health.
    - a. Remove excess soil from the top of the root ball – above the root collar.
    - b. Remove excess roots established above the root collar as a result of excess soil.
    - c. Remove circling / girdling roots.
  4. Set top outer edge of the root ball at the average elevation of the proposed finish grade. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above [grade, mulch]. Do not place soil on top of the root ball.
  5. Face plant to give the best appearance or relationship to each other, adjacent structure or primary view. City Representative may direct Awardee to rotate plants during installation, prior to backfill and compaction.
  6. Install tree and palm stabilization (staking / bracing / guying) per project details.
    - a. Adjust trees and palms as needed to maintain plumb throughout warranty period at no additional cost to City. See Item \_\_ Warranty for exceptions.
    - b. Remove all above grade stabilization components. Stabilization systems may be removed at any time that the Awardee determines the trees are fully established. Stabilization may remain in place beyond the warranty period if necessary; the warranty period shall continue until all above-grade components are removed.
  7. Backfill planting pit with same soil excavated from pit until the pit is 2/3 full; water thoroughly before placing remainder of backfill; place any amendments listed below; repeat watering until fully saturated. Do not use muddy mixtures for backfilling.
    - a. Place slow release fertilizer at all palms; 8-2-12-4Mg analysis; composition may be adjusted based on soil test recommendations; apply at manufacturer recommended rate or per soil test recommendations.
    - b. Place slow release fertilizer (granular or tablet) at all trees per manufacturer instructions and soil test recommendations.
    - c. Place 12 ounces of mycorrhizal inoculant product at each tree and palm planting location if not already incorporated into a prepared planting bed.
  8. Form a soil ring for water retention around every tree and palm. Soil rings may also be required around large shrubs or shrubs not included in planting beds. Locate soil ring at the edge of the planting pit or as indicated on the detail drawings.
  9. Correct tree canopy as needed per Item F – Pruning (below).
- B. Install ground cover plants per spacing specified on drawings. Adjust quantities as necessary to fill planting bed at specified spacing.
- C. Anti-desiccant sprays may be approved in unique circumstances. If approved, apply using power sprayer to provide adequate film over trunks, branches, stems, twigs and foliage.
- D. Finish Grading:

1. After plant material has been installed and approved, planting beds shall be raked to an even grade to conform to pre-mulching finish grades.
2. Provide a finished surface with positive drainage across all planting areas per the project drawings. Planted areas shall generally drain away from buildings and structures with no ruts or ponding.
3. Notify the City Representative of any site conditions or drawing discrepancies that will prevent proper drainage or finish grading.

E. Mulch:

1. Install mulch at tree and palm planting pits per drawings.
2. Install mulch throughout planting beds per drawings.
3. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

F. Pruning:

1. Prune trees and shrubs to remove dead/broken branches and provide required clearances per drawings.
  - a. Limit of Clear Sight, where indicated on drawings: 8'-6" above roadway pavement.
  - b. Pedestrian Clearance: 7'-0" above pavement.
  - c. Vehicle Clearance: 14'-0" above roadway pavement.
2. Trees shall only be pruned to promote long term structural integrity or to provide required clearances. Pruning shall not be performed to "compensate" for root loss.
3. Correct tree canopies (crown) to promote a single, dominant central leader by subordinating or removing competing (codominant) stems when necessary. Do not remove more than 25% of foliage without prior approval.
4. Multiple leader plants: Preserve the leader(s) which will best promote the symmetry of the plant.
5. All tree pruning shall be per ANSI A300, Part 1 - Pruning

**3.4. MAINTENANCE**

- A. Provide maintenance as needed during installation and until Installation Acceptance
- B. Maintenance Period: Provide maintenance of installed material and planting areas for a period of [90 days (3 months)]. The Maintenance Period shall begin at the date of Installation Acceptance.
  1. Maintenance shall include but is not limited to pruning, cultivating, mowing, weeding, fertilizing, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.

2. Re set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
  3. Reset trees and palms as needed to maintain plumb.
  4. Tighten and repair guys and stakes as needed.
  5. Correct defective work immediately after deficiencies become apparent and weather permits.
  6. Plant material shall be maintained at the specified quality (e.g. Florida No. 1).
- C. Establishment Period: Provide supplemental water and plant care as necessary to establish installed material for a period of 3 months.
1. Provide a schedule to Program irrigation system for establishment; provide any adjustments to the program as necessary throughout establishment period.
    - a. Do not oversaturate soil.
      - i. Remainder of Warranty Period: Monitor plant performance and provide supplemental water as needed.
  2. Adjust quantity and frequency of establishment irrigation based on actual site conditions, rainfall, and plant performance.
  3. Submit weekly report of watering activities to City Representative. Include date of watering, location, method and quantities applied.
  4. Provide any supplemental plant care necessary for the establishment of the installed plants.

### **3.5. ACCEPTANCE**

- A. Installation Acceptance: City Representative will inspect plant material and incidental material covered in this section upon Awardee request and issue a written Installation Acceptance or "punch list" of items to be corrected.
1. Awardee shall request inspection a minimum of 5 working days before desired inspection date. City Representative will perform the inspection on the desired date or no more than [2] days after.
  2. If a punch list is provided, then re-inspection is required. The correction and re-inspection timeframe will be determined based on the amount of work required.
  3. Installation Acceptance will be provided once all punch list items are resolved.
- B. Maintenance [Establishment] Acceptance: City Representative will inspect materials and areas maintained by Awardee upon request and issue a written Maintenance Acceptance or punch list.
1. Awardee shall request inspection a minimum of 5 working days before desired inspection date. City Representative will perform the inspection on the desired date or no more than [2] days after.
  2. Awardee may request inspection up to 10 days before completion of maintenance period.

3. Awardee shall continue maintenance until all punch list items are resolved.
  4. Maintenance Acceptance will also address plant material establishment.
- C. Final Acceptance: The City Representative will inspect the plant material and incidental materials near the end of the Warranty Period.
1. The City Representative will issue a written summary of required corrections/remediation if any.
  2. The Warranty Period shall be extended until all soil rings are leveled and any other temporary establishment measures removed or corrected including all above grade bracing and guying material.
  3. The City Representative may inspect the work at any time during the Warranty Period.
  4. If no deficiencies are documented or corrections requested by the conclusion of the Warranty Period, then Final Acceptance is implied. Written acceptance can be provided upon request.

### **3.6. PROTECTION**

- A. Install tree protection, job site fencing, and other protective measures per the project drawings, general conditions, or other specification sections prior to beginning other work.
- B. Tree protection shall be installed and maintained per the City of Tampa Tree Protection and Site Clearing Ordinances and Landscape Technical Manual

**END OF SECTION**

## **STORMWATER CONVEYANCE**

### **SECTION 33 42 00**

#### **PART 1 - GENERAL**

##### **1.1. DESCRIPTION OF WORK**

- A. Section Includes:
  - 1. Pipe and fittings.
  - 2. Nonpressure transition couplings.
  - 3. Cleanouts.

##### **1.2. RELATED SECTIONS**

- A. Section 03 30 00      Cast-in-Place Concrete.
- B. Section 31 20 00      Earth Moving.

##### **1.3. REFERENCES**

- A. ASTM F 477      Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- B. ASTM F 794      Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
- C. ASTM F 1668      Standard Guide for Construction Procedures for Buried Plastic Pipe
- D. ASTM D 1785      Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- E. ASTM D 2321      Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- F. ASTM D 2466      Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
- G. ASTM D 3034      Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

##### **1.4. SUBMITTALS**

- A. Product Data: Submit manufacturer's product data, including installation instructions.
- B. Shop Drawings: Submit manufacturer's shop drawings, indicating layout, dimensions, materials, components, and accessories.
- C. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.



- D. Installer's Project References: Submit installer's list of successfully completed catch basin projects, including project name and location, name of architect, and type and quantity of catch basins installed.
- E. Warranty Documentation: Submit manufacturer's standard warranty.

**1.5. QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of catch basins of similar type to that specified.
- B. Installer's Qualifications:
  - 1. Installer regularly engaged, for a minimum of 5 years, in installation of catch basins of similar type to that specified.
  - 2. Employ persons trained for installation of catch basins.

**1.6. DELIVERY, STORAGE AND HANDLING**

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in accordance with manufacturer's instructions.
  - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
  - 3. Store materials in clean areas, protected from exposure to harmful weather conditions.
  - 4. Store materials out of direct sunlight.
  - 5. Protect materials during storage, handling, and installation to prevent damage.
- C. Handle pipe, fittings, catch basins and stormwater inlets according to manufacturer's written instructions.

**1.7. PROJECT CONDITIONS**

- A. During Cold Weather:
  - 1. Do not use frozen materials.
  - 2. Do not use materials mixed or coated with ice or frost.
  - 3. Do not build on frozen Work.
- B. During Wet Weather: Do not build on wet, saturated, or muddy subgrade.

## **PART 2 - MATERIALS**

### **2.1. MANUFACTURERS**

- A. Manufacturer shown as basis of design:
  - 1. NDS, Inc., 851 North Harvard Avenue, Lindsay, California 93247. Toll Free 800-726-1994. Phone 559-562-9888. Toll Free Fax 800-726-1998. Fax 559-562-4488. Website [www.ndspro.com](http://www.ndspro.com). Email [nds@ndspro.com](mailto:nds@ndspro.com).
- B. Substitutions complying with drawings, notes and specifications may be submitted for approval.
- C. Single Source: Provide catch basins, grates, and components from single manufacturer.

### **2.2. PVC PIPE AND FITTINGS**

- A. PVC Type PSM Sewer Piping:
  - 1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
  - 2. Fittings: ASTM D 3034, PVC with bell ends.
  - 3. Gaskets: ASTM F 477, elastomeric seals.
- B. PVC Pressure Piping:
  - 1. Pipe: ASTM D 1785, Schedule 40 PVC, with plain ends for solvent-cemented joints.
  - 2. Fittings: ASTM D 2466, Schedule 40 PVC, socket type.
- C. PVC Water-Service Piping:
  - 1. Pipe: ASTM D 1785, Schedule 40 PVC, with plain ends for solvent-cemented joints.
  - 2. Fittings: ASTM D 2466, Schedule 40 PVC, socket type.
- D. Plastic Cleanouts:
  - 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. Examine areas to receive piping and catch basins.
- B. Notify Landscape Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

### **3.2. PIPING INSTALLATION**

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install piping pitched down in direction of flow.
  - 2. Install piping with 12" minimum cover.
  - 3. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
  - 4. Install PVC profile gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
  - 5. Install PVC water-service piping according to ASTM D 2321 and ASTM F 1668.

### **3.3. PIPE JOINT CONSTRUCTION**

- A. Join gravity-flow, nonpressure drainage piping according to the following:
  - 1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.
  - 2. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
  - 3. Join dissimilar pipe materials with nonpressure-type flexible couplings.

### **3.4. CLEANOUT INSTALLATION**

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
  - 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.

2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 3 inches above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

### **3.5. CATCH BASIN INSTALLATION**

- A. Install catch basins in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install catch basins and grates level, plumb, square, and to elevations indicated on the Drawings.
- C. Install catch basins on top of compacted gravel base as indicated on the Drawings.
- D. Recess top of grates 1/8 inch below finish grade.
- E. Connect drainage piping to catch basins in accordance with manufacturer's instructions.
- F. Backfill evenly around catch basins with specified material.
- G. Ensure no large stones or debris are in contact with catch basins.
- H. Concrete Collars:
  1. Encase catch basins with concrete collars as indicated on the Drawings.
- I. Keep concrete, sediment, and debris out of catch basins during installation.

### **3.6. FIELD QUALITY CONTROL**

- A. Piping
  1. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
    - a. Submit separate reports for each system inspection.
    - b. Defects requiring correction include the following:
      - i. Alignment: Less than full diameter of inside of pipe is visible between structures.
      - ii. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      - iii. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      - iv. Infiltration: Water leakage into piping.

- v. Exfiltration: Water leakage from or around piping.
  - 2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 3. Reinspect and repeat procedure until results are satisfactory.
- B. Catch Basins
- 1. Remove and replace with new material, damaged components that cannot be successfully repaired

**3.7. CLEANING**

- A. Clean interior of piping of dirt and superfluous materials. Flush with water.
- B. Clean catch basins of accumulated sediment and debris before final project completion.

**3.8. PROTECTION**

- A. Protect Work of this Section to ensure that Work will be without damage or deterioration at time of Substantial Completion.

**END OF SECTION**